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March 12, 1956

Electrical World

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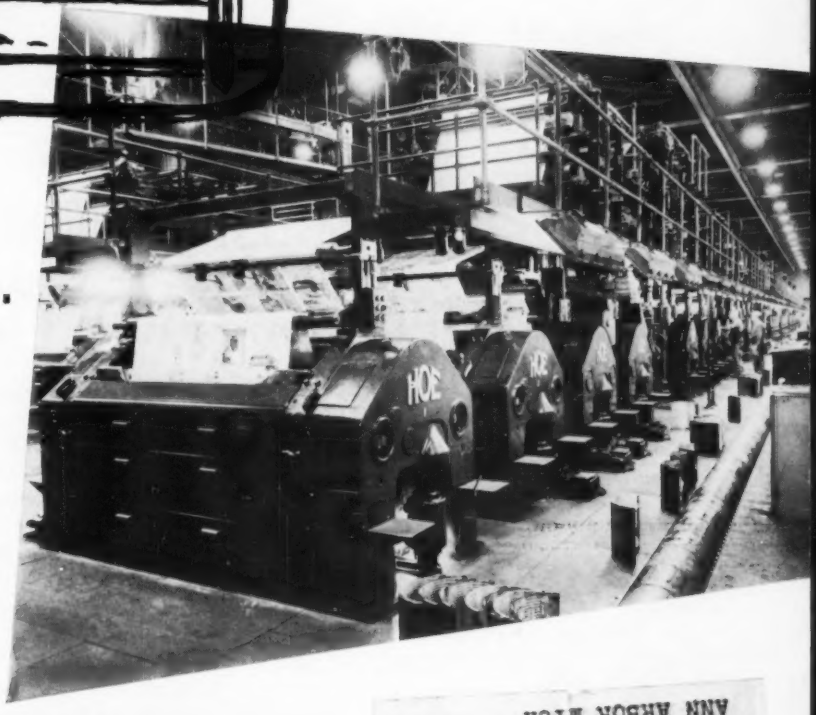

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E B POWER GS W 12
UNIVERSITY MICROFILMS IN
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ANN ARBOR MICH

TOP TALENT attending General Electric planning conferences means decision-making utility men have the opportunity to exchange ideas with leaders in their own profession. And, G-E engineers gain the first-hand knowledge to realistically appraise their product-planning activity.

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With distribution becoming more and more the "big business" of electric utility operation and finance, this much is clear: possibilities for improving power system efficiency to meet mushrooming loads depend upon sound advance planning.

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Electrical World

Published for 82 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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• • •

COMING NEXT WEEK—The electric utility industry has been somewhat wary of the all-electric home. The reason: Very little is known about its load characteristics. So EW has rounded up all the information it could get and will present it in 24 attractive pages.

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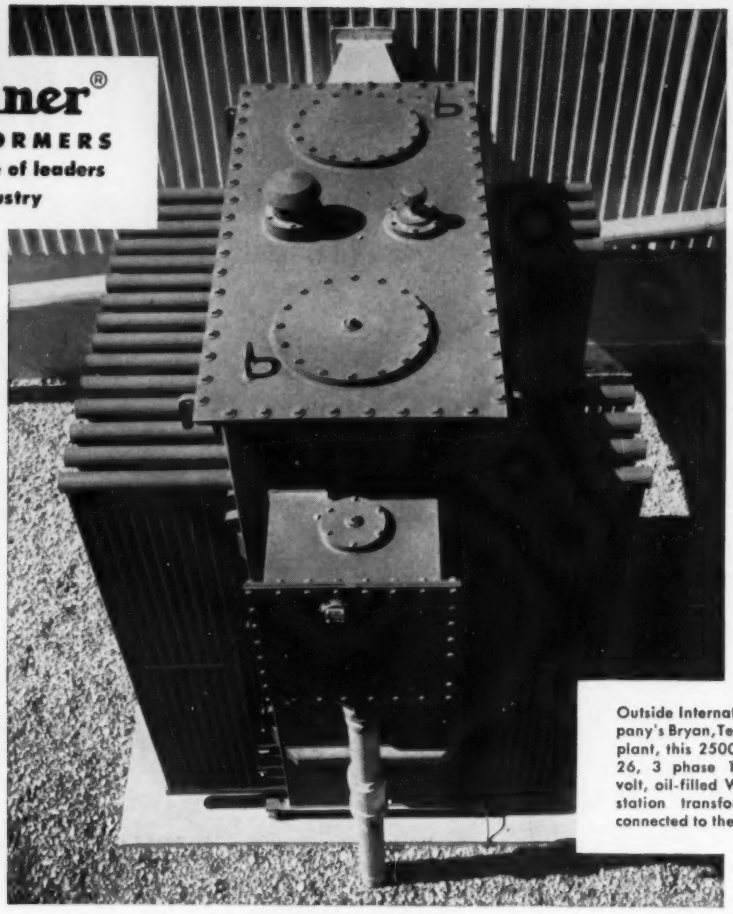

Outside International Shoe Company's Bryan, Texas rubber soling plant, this 2500 kva, type HPA-26, 3 phase 12,500 to 2400 volt, oil-filled Wagner unit substation transformer is throat-connected to the load-center.

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... liberally designed to give years and years of service ...

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ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS–AIR AND HYDRAULIC

EDITORIALS

Is An "Energy Institute" One Answer

Some industry leaders and electrical engineering students are understandably concerned over the de-emphasis of 60-cycle power studies in college curricula. Power system design is giving way to electronics, communications, and other studies. There is talk now of further reducing power subject matter in the prescribed electrical engineering courses at Columbia University.

These observations lead us to a suggestion which has come our way from Walter La Pierre, assistant professor in the school of engineering, Columbia University. La Pierre believes that present day students look upon the utility industry as a minute segment of the vast expanse of electrical technology. To emphasize the economic, social, and cultural importance of the utility to the student, La Pierre suggests establishment of an "Energy Institute."

Such an institute, says La Pierre, could be set up to train students in many phases of electric utility operation and planning. He suggests a university campus as the most appropriate place because of the independence it would afford from any particular segment of the industry and because of the pre-engineering training that a university could offer.

Following three years of pre-engineering training, the student would attend the institute for one or two years. The institute would offer such courses as heat power; atomic power reactors; bulk energy conversion, transfer, and utilization; economics; finance; business organization; leadership; rate making; and utility regulation.

The students, La Pierre suggests, would come from among the bright young high school graduates employed by utilities over the nation. They would be sent to the institute as part of their jobs, and their tuition would be paid by their companies.

We pass along this idea for industry discussion. At some point the industry will have to decide whether this idea or some other can be worked into a program for getting the kind of trained people the industry needs for its future growth.

The Santee-Cooper Report

The reports recently issued by the special committee investigating the South Carolina Public Service (Santee-Cooper) Authority leave one strong implication. That is that the authority, in its desire for expansion, may well have led rural electric cooperatives in the state on an expensive wild goose chase for low-priced power.

Both the majority and minority committee reports spotlighted the fact that some 16 rural electric co-ops in the state are already paying Santee-Cooper well above original contract prices for power. And what's more, the committee unanimously recommended that the rates to co-ops be raised still higher.

The story behind these sections of the committee reports is briefly this:

In 1950 Santee-Cooper signed a 35-year contract with Central Electric Power Cooperative (consisting of 16 distribution co-ops in the state) to furnish power for 6 mills per kwhr. As a part of the bargain, Central was to provide financing through a federal loan for the $13-million transmission system required to deliver the power. Furthermore, Central agreed to turn this system over to Santee-Cooper for a token payment at the end of the contract period.

To farmer members of the co-ops, this sounded like a good deal. The contract seemed air tight.

Last year, after some difficulties, the Santee-Cooper power rate to Central was renegotiated to 6.4 mills—0.4 mills above the original contract rate. This was said to be temporary.

Now comes the investigating committee, composed of legislative and executive representatives, to say that even the 6.4 mill rate is too low and an upward revision is needed. The committee did not specify how much of a rate boost is required, but a small boost would take it above the prevailing electric company rates in the area. Service from this source has been available to the co-ops from the beginning.

Among the questions the investigating committee chose to avoid are these:

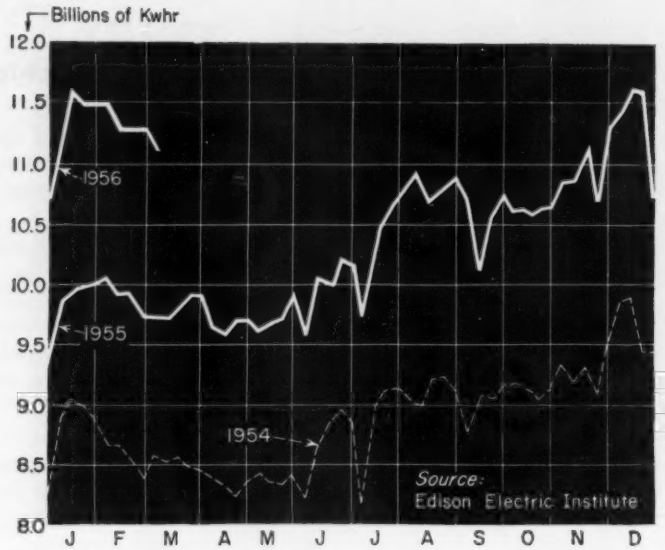
1. Did Santee-Cooper underprice power to the rural co-ops to promote its own expansion?

2. During the term of the contract, how much more will the co-ops have to pay for power than if they had bought it from electric companies serving the area?

3. When will Central or Santee-Cooper begin repaying the $13-million transmission loan to the Rural Electrification Administration?

4. Was there a real justification for this loan in the first place?

ELECTRICAL WEEK



OUTPUT

Week ended March 3
11,199,000,000 Kwhr
Up 15.1%

Atomic Energy Commission requirements — 1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 11.1%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Mar. 3	+15.1	+10.2	+8.9	+22.7	+7.6	+17.5	+10.7	+10.1	+17.2	+11.8
Feb. 25	+16.0	+11.7	+10.2	+25.0	+7.6	+14.5	+13.7	+7.5	+21.1	+15.2
Feb. 18	+14.2	+10.0	+6.7	+22.8	+8.3	+11.2	+14.5	+8.7	+23.1	+14.6

Seasonally Adjusted Index 214.0 Week Ago 216.8 Year Ago 185.5

Issue's Highlights—House passes $760-million multi-purpose Upper Colorado project with some changes from Senate version of bill. Measure now goes to joint committee . . . Special committee completes report on its investigations of Santee-Cooper but splits on findings . . . Industry spokesmen tell joint Congressional committee government must rely on private industry for nuclear power developments . . . American G&E announces 5-year, $700-million expansion program, biggest in its history . . . Florida utilities plan joint 200,000-kw nuclear power plant . . . Westinghouse strike settlement up to union.

Memphis Plant Cost—According to report by Burns & Roe, engineering firm, actual cost of proposed 750,000-kw Memphis plant will be $127,688,000 with overall outlay estimated at $135 million. Because of anticipated growth in Memphis and Shelby County, plant's capacity probably will be increased to one million kw by 1959 and must be planned for ultimate capacity of 1.5 million kw. Another new plant will be needed about 1960 to be in operation by 1962.

Arizona Precedent—Arizona Corporation Commission has set state precedent by taking over jurisdiction of electric co-op. In agreeing to regulate operations of Trico Electric Co-op in parts of Pima, Pinal, and Santa Cruz Counties, commission has imposed limitations on its growth into areas already served by competing utilities. Utilities are Tucson G&E and Citizens Utilities which had asked assurance Trico would not be able to compete with them.

New England—About 90% of new homes occupied in 1955 in the Connecticut "Capital Area", centering at Hartford, now cook with electricity . . . Hartford Electric Light reports that use of natural gas on interruptible basis in operation of mercury boiler unit at South Meadow station between last August and November resulted in operating savings sufficient to pay for its share of cost of installing gas facilities.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire—Former Joint Atomic Energy Committee Chairman W. Sterling Cole (R-N. Y.) introduced legislation (HR 9743) to permit companies to participate in demonstration atomic power projects under AEC rules without becoming subject to other federal regulation . . . AEC general counsel William Mitchell has issued opinion stating that obtaining license for atomic facility does not constitute "relationship" with government under meaning of section 152 of the 1954 Atomic Energy Act. Under that provision, establishing relationship with government subjects private company's patents to seizure.

TVA officials presented their case for use of power revenues to back up initial orders on a new 180,000-kw steam unit at John Sevier power plant in closed hearings before House Appropriations Committee last week. Congress has not yet moved on the suggestion which would dedicate power income to payment of initial $3.5-million costs on $28-million unit.

Freight Rate Increase—Interstate Commerce Commission has approved 6% freight rate increase for railroads and certain other carriers, effective March 7. General commodities, including bulk oil shipments get straight 6% hike; but coal and some other commodities were given "hold down." Line-haul rates on anthracite coal, bituminous (except lignite) coal, and coke, in carloads, can be increased 6% but subject to maximum 15¢ per net ton. Lignite and lignite briquets can be increased 3% with maximum 7¢ per net ton.

Rate Matters—FPC has suspended Electric Energy, Inc's proposed $71,000 (3.1%) electric rate increase for six months ending June 30, 1956, to AEC's Paducah project . . . FPC examiner has ruled that rates of South Carolina Generating Co to Georgia Power "are just and reasonable" and they should not be changed.

New Jersey Taxes—Bi-partisan legislative conference is considering proposal to tax utility bills 1% to raise about $5 million a year for school construction.

More OVEC Power for AEC—Ohio PUC has approved boost in Ohio Valley Electric power to AEC between now and July 1. AEC normally gets 1.8 million kw.

ABOUT PEOPLE IN THE INDUSTRY

Idaho Power's Pres T. E. Roach last week denied charge by Oregon attorney general that company was violating state law by starting construction on Brownlee. Company, said Roach, is proceeding "under authority of federal license . . . which contains specific starting and completion dates." It was pushing ahead "as rapidly as weather conditions will permit," because of impending power shortages in its area and entire Northwest.

American businessmen continue to underestimate their long-term projections, according to General Electric Pres R. J. Cordiner. He urged "vigorous effort" to "catch up with long-term opportunities." GE, he noted, has budgeted for 1956 an increase in sales billed of 15% over 1955. "As a result of underestimating growth in standards of living, have we in business not been guilty too long of targeting our markets at upper income groups?"

More News About People page 36

Upper Colorado Project

In House Bill . . .

- **Glen Canyon: 800,000 kw**
- **Flaming Gorge: 72,000 kw**
- **Navajo: No power**
- **Curecanti: Unknown power**

In Senate Bill . . .

- **Glen Canyon: 800,000 kw**
- **Flaming Gorge: 72,000 kw**
- **Navajo: No power**
- **Curecanti: Unknown power**
- **Juniper: 25,000 kw**
- **Echo Park: 200,000 kw**

House Passes Upper Colorado Bill

- **Legislation for $760-million multi-purpose plan goes to joint committee**
- **Controversial Echo Park Dam dropped by House, previously passed Senate**
- **Possibility that private utilities may market the project's power left open**

The $760-million Upper Colorado River Basin Development bill passed last week by the House almost certainly will be adopted by the Senate, assuring President Eisenhower's single large federal reclamation program of success.

The Senate has already passed a similar measure. But there are differences which a Senate-House conference committee will have to work out.

For one thing, the Senate voted last year to include controversial Echo Park Dam, second-largest ($176 million, 200,000 kw, 6.5 million acre-feet) storage unit in the water development plan. In dropping this, House leaders were able to deal a death blow to the bill's opposition. They carried the vote 256 to 136—almost a 2-1 margin.

The House went along with its Interior Committee in leaving open the possibility that power from the storage dams be marketed by private utilities in the area. Ten upper basin utilities have offered use of their systems, emphasizing their willingness to serve preference customers through wheeling or resales agreements. The committee report on the bill had termed this proposal "entirely reasonable" and "consistent with the policy expressed by the Congress for many years," and directed the Interior Department to give it careful consideration.

The bill provides $145 million for transmission lines. This amount would finance a complete transmission grid for the upper basin, and it is this figure which is included in cost allocation which gives rise to the 6-mill power price.

If the offer of the private utilities is accepted by Interior, the government would need to build only backbone transmission lines to connect the companies' systems with busbar. This would result in a whittling down of the cost allocated to power, with a resultant reduction, perhaps as much as one mill, in the price.

It is possible the House-Senate conference could insist on retaining some of the features of the Senate bill. But it is probable the eventual result will be a slicked-up version of the House bill, leaving out controversial features such as Echo Park.

In any case, proponents of the legislation made it clear the majority of Congress favors Eisenhower's basic idea of a comprehensive basin-wide development plan involving federal financing of large multi-purpose storage units, regulating dams, and so-called participating irrigation plans financed through the life of the project with excess power revenues.

Here are the chief features of the bill approved by the House:

- A four-dam system (see map) in-

cluding giant Glen Canyon Dam ($421 million, 800,000 kw, 26 million acre-feet), Flaming Gorge Reservoir ($83 million, 72,000 kw, 4 million acre-feet), Navajo Dam ($36 million, no power, 1.5 million acre-feet), and Curecanti Dam ($50 million, unknown power potential, one million acre-feet). Curecanti construction hinges on a forthcoming Bureau of Reclamation report. The Senate had authorized these storage projects, plus Echo Park and Juniper, a $16-million, 25,000-kw diversion unit upstream on the Yampa River in Colorado.

• Twelve participating irrigation projects, costs of which will be offset chiefly by power revenues. Only one of these—Central Utah—will supply power. Central Utah's capacity will be 61,000 kw; its cost is estimated at $231 million.

• Power generation at a market cost of 6 mills. Generating costs at Glen Canyon, the big producer, will run about 4.7 mills. The 1.3 mill difference will go toward repayment of the entire project, with long-range excess revenues being used to defray expenses of constructing irrigation works already programmed by some of the upper basin states, as well as accumulating in a draw-down account for use by those whose irrigation needs are far off. Division of the excess power revenues in this fashion is based on unused water allotments allocated by the Colorado River Interstate Compact.

Echo Park Withdrawal Aids Bill

Withdrawal of Echo Park Dam is credited with carrying the bill. The dam, situated on the Colorado River just below the confluence of the Green and Yampa rivers, would have flooded out much of the Dinosaur National Monument in Utah.

It was this fact which rallied conservationist organizations to the side of southern California, which lies downstream and which has been using at least the full amount of Colorado River water allocated to the lower basin by the Interstate Compact. Californians led the fight which was driving a wedge successfully through the entire basin project when their down-with-Echo-Park platform was maneuvered out from under them.

Eisenhower's role in plugging his pet federal project cannot be underestimated. He first proposed the project in his budget message two years ago,

(*Continued on page* 63)

Strike Settlement Up to Union

Federal mediators' proposal accepted by Westinghouse, but Carey, IUE head, says his group is in no hurry to accept it

Almost five months after it began, the Westinghouse Electric Corp strike looked as if it would be settled as EW went to press on terms supplied by a special government panel. It will be a settlement that means a compromise by both sides.

The last holdout to the agreement is the negotiating committee of the International Union of Electrical Workers (AFL-CIO), headed by IUE Pres James B. Carey. Westinghouse took the proposal suggested by the federal panel and termed it "fair to both the company and union."

Carey said that his union was in no hurry to accept the plan. He further stated that it may take several days to decide its action on the peace proposal.

The settlement was stalemated when, on the 139th day of the strike, both company and union appealed to the mediation panel to make a recommended contract. They admitted there was no longer any chance of negotiating an agreement.

In essence, it was a fact-finding maneuver that may bring about the agreement. With Federal Mediator John R. Murray, two special arbitrators—Dave Cole, former Federal Mediation Director, and George W. Taylor, former Wage Stabilization Board chairman—took the results of the long negotiating sessions and formed a compromise plan.

Details Outlined

These are the details:

• Length of contract—a four-year pact to run until 1960, in effect five years from beginning of the strike with the local unions reserving the right to negotiate local supplements each year separately in addition to those provided by the master agreement. However, the local option is not expected to affect the stability of the long-term agreement. The contract can be opened in 1958 for guaranteed annual wage discussions and for non-economic items in 1957. Five-year coverage was a company demand.

• Wages—The wage increase averages slightly above 23½ ¢ an hr for the five-year period. It includes improvement in pensions and personal insurance plans for employees and cost of living wage adjustments.

• Time studies—The company will be permitted to make time studies for production workers not on incentive pay. But any new work standards adopted as a result of the time studies will be arbitrated if the union objects to the standards. Westinghouse had refused during negotiations to agree to third-party arbitration of the work standards.

• Discharges—The company agrees to re-hire 57 workers out of the total 93 that had been discharged for violence during the strike. Other dismissals will be settled by arbitration.

Two Issues Cause Delay

Delay in accepting the pact by union negotiators is over discharges and time-study plans. Union is insisting that all workers be returned to their jobs. The split over re-hiring and arbitration was settled when 26 Westinghouse plant managers who discharged the 93 employees explained each case to the three-man mediation panel. The panel then decided which discharges should be cancelled and which should be settled by an arbitrator.

The Westinghouse settlement figures are almost identical with the contract reached last fall between IUE and the General Electric Co.

Yankee Atomic Elects

Recently elected vice presidents of Yankee Atomic Electric Co are Sherman R. Knapp, president of Connecticut Light & Power Co; Roger J. Coe, vice president of New England Power Co, Boston; and Herbert M. Johnson, chief district engineer of the New England Power Service Co of Boston, Mass. New assistant treasurer is B. Edward Zinn, assistant treasurer of New England Electric System. Further information on the Yankee Atomic Electric appointments will appear in the March 19 issue of Electrical World.

U.S. Must Back Private A-Industry

- **GE's McCune tells joint Congressional committee that government must rely on private industry if this country is to top world in nuclear power field**
- **Lindseth sees no need for large-scale government program to build reactors, but insurance problem looms as obstacle to private industrial development**

Congress was warned last week that the federal government must demonstrate its confidence in American industry if the United States is to retain its world-wide superiority in the atomic power field.

Francis K. McCune, vice president of General Electric Co and general manager of the company's Atomic Products Division, voiced this note of caution in hearings before the Joint Congressional Committee on Atomic Energy.

Big U.S. Reactors not Needed

Testifying for Edison Electric Institute, Elmer Lindseth, president of Cleveland Electric Illuminating Co, stated that there was no need "for the government to embark on a large scale program of building 'demonstration' reactors with taxpayers' funds. . . ."

But McCune pointed out that industry has come up against a major obstacle in the way of developing a private industry. That is, the inability to guarantee that financial liability in event of an atomic catastrophe can be met. McCune's plea: The government should offer to underwrite at cost the remote but stupendous risks associated with operating atomic reactors.

Murray Favors U.S. Program

McCune's comment, coming as it does from the director of one of the nation's largest private endeavors in the power reactor field, is particularly important at a time when informed leaders of Congress are seriously weighing a proposal to force the Atomic Energy Commission to get into the reactor-building business in competition with private firms.

This proposal, put forth by AEC Commissioner Thomas E. Murray, envisions a federal power reactor demonstration program of the size now being planned by private American industry. It was viewed by McCune as a multi-million-dollar approach to a problem which could be best solved by government partnership in the risks associated with the existing program.

McCune received unexpected support from the only big publicly owned organization undertaking a major reactor project. In a letter to the joint committee, R. L. Schacht, general manager of Consumers Public Power District of Nebraska, which is designing a 75,000-kw sodium-graphite plant, said the only alternative to a government-sponsored atomic insurance program is complete federal ownership and operation of all experimental and developmental nuclear power plants. This alternative, said Schacht, is "not the proper one."

U.S. A-Plants Equally Risky

Philip Sporn, president of American Gas & Electric Co, Ohio Valley Electric Co, and Nuclear Power Group, Inc, agreed with McCune and Schacht. He said, "This (government construction) proposal is not the way of avoiding the insurance problem; if the government builds the plants, it must face the problem of liability in the event of an atomic catastrophe just as squarely as we must face it and, in addition, must pay the full cost of the plants.

"A refusal to face up to this liability problem," Sporn said, "does not seem to me to be consistent with the purpose of the Atomic Energy Act to encourage the growth of a non-federal atomic industry—a growth which, I believe, will be largely or wholly checked by the failure to provide an adequate solution to the problem. . . .

"At some point . . . we need to know that the problem will be solved. Until that point is reached, we are going to have progressively more difficulty in justifying the heavy financial contributions which we are putting into the project (Commonwealth Edison Co's 180,000-kw Dresden Plant near Chicago) and which, without insurance, could leave us at the date of operation with a plant that prudence might not permit us to run."

Sporn also endorsed McCune's view that companies involved in atomic power programs would be willing to pay premiums on a government-sponsored insurance program to cover risks above the amounts picked up by the private insurance companies.

Bricker Favors U.S. Insurance

Reflecting the growing interest of joint committee members in this problem, Sen John Bricker (R-Ohio) said he now believes it may be necessary to establish such a program, until such time as experience dictates another course. And Joint Committee Chairman Clinton P. Anderson (D-N.M.) indicated he was beginning to lean toward the same conclusion.

Murray says the U. S. is losing out to Russia in developing the atom and he suggests a federal program as the quickest way to get full-scale power reactors working in this country. His recommendation came close on the heels of McCune's and other manufacturers' and utility officials' warnings that, unless the insurance problem is solved, the private reactor program would bog down.

Public Power Backs Murray

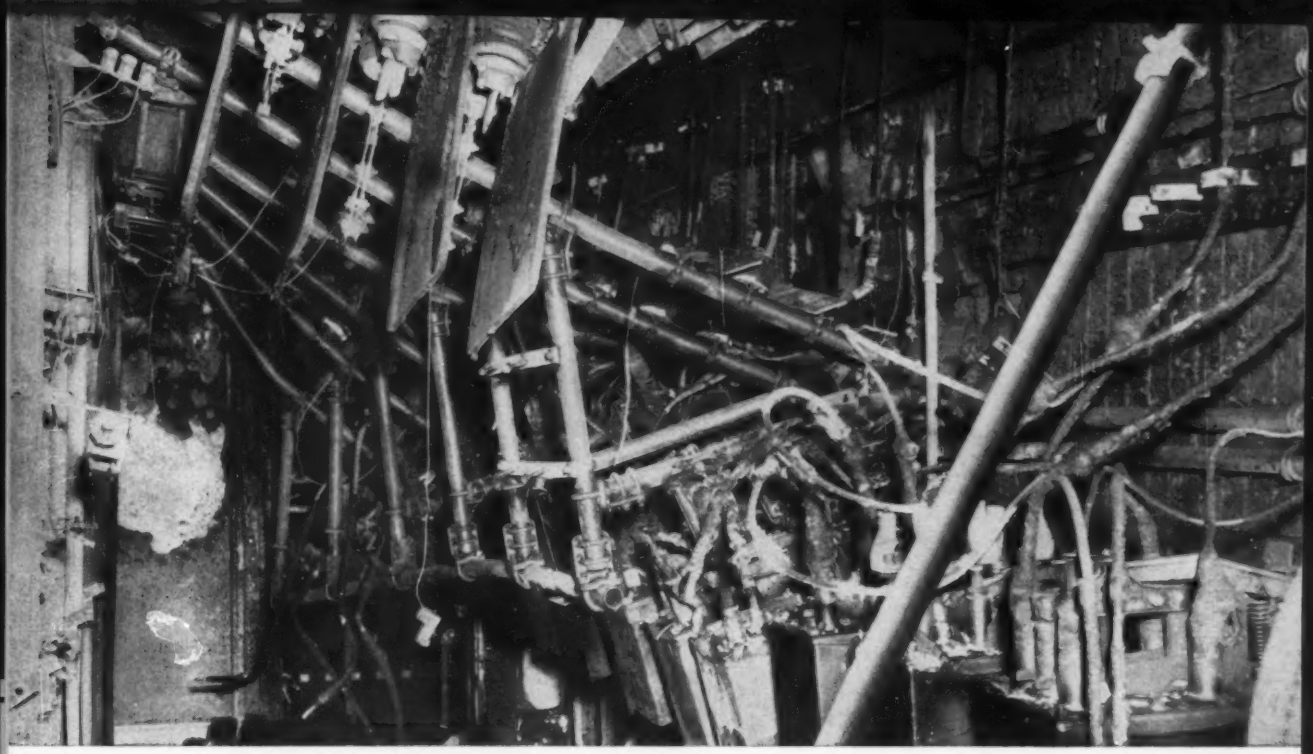
Murray's plan is supported widely by public power advocates who see it as the surest way to inject preference rights into the new industry.

McCune had this to say:

"Government ownership of reactors does not solve this insurance problem. From the point of view of the public, the harm would not be less severe because the reactor is government-owned rather than privately-owned. Moreover, the persons harmed (by an accident) would have the same interest in obtaining indemnity for their loss."

Since public acceptance is a key factor in forwarding the American reactor program, McCune said, the willingness of the federal government to show its confidence in the reactor plans of private firms by underwriting

(*Continued on page* 63)



RUNAWAY SHORT CIRCUITS can destroy property, halt production. The fire that started in this switchboard shut down power supply for 19 hours, damaged building, injured personnel.

Obsolete Switchgear Can Cripple Your Plant

Protect personnel, equipment, production—Modernize with G-E Metal-clad Switchgear

Your switchgear is "obsolete" when potential short circuits exceed its interrupting capacity. Under these conditions it can literally explode. Are you sure you have adequate interrupting capacity? Chances are your plant electrical load has gone way up since your switchgear was originally installed. If so, you need to make a careful reappraisal of your switchgear installation. Any compromise in protection here may turn out to be dangerous to personnel and expensive in terms of damaged equipment and lost production. That's why you can't afford less than the best.

FOR THE BEST IN PROTECTION, modernize your switching centers with new General Electric Metal-clad Switchgear. A modern G-E installation works for you six ways to:

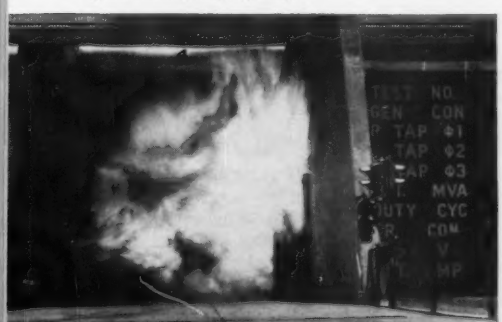
- reduce fire hazards to life and property
- reduced electrical hazards to personnel
- save delay in procuring obsolete renewal parts
- minimize service interruptions
- assure production continuity
- make future electrical expansion easy

FOR COMPLETE DETAILS ask your nearest G-E Apparatus Sales Representative for Bulletin GEA-5664, or write to General Electric Company, Schenectady 5, New York.

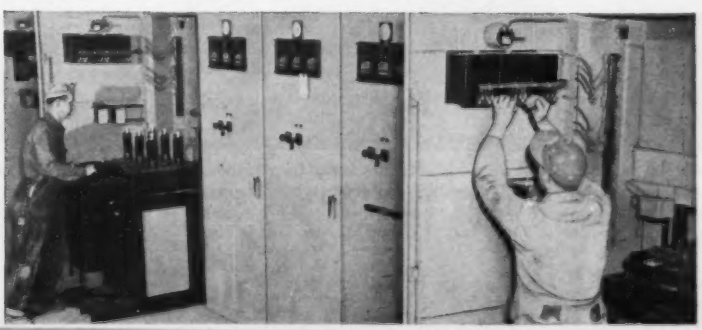
511-12A

GENERAL ELECTRIC

DRAMATIC TEST shows possible results of inadequate interrupting capacity.



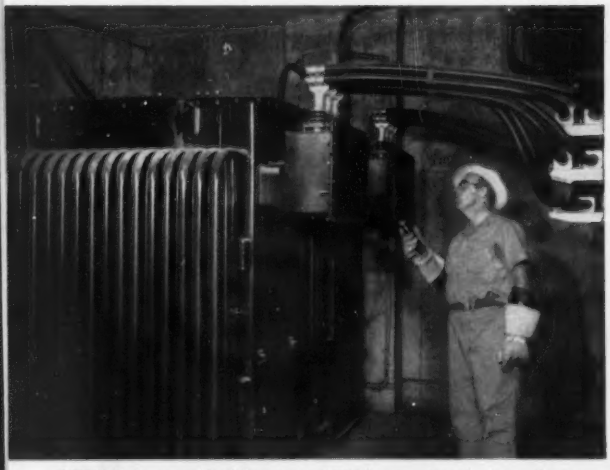
IMPROVED PROTECTION offered by a modern G-E metal-clad switchgear installation is your assurance of maximum personnel safety and production continuity.



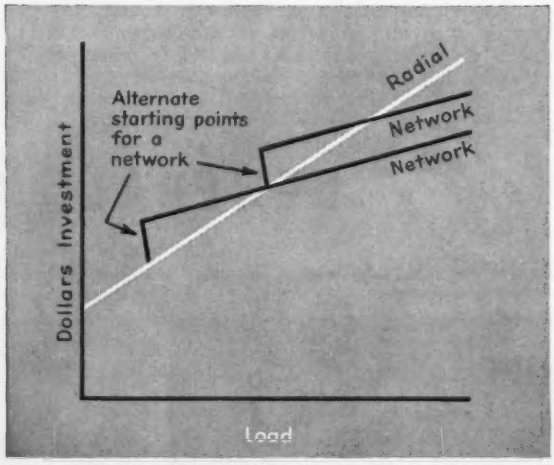
NETWORK TRANSFORMERS

LOAD GROWTH IN CHARLOTTE, N. C., particularly in the downtown area around the Jefferson Standard Life Insurance Building shown above, has been rapid in recent years. Expecting even more rapid growth in the future, Duke Power Company is already planning for eventual conversion to a secondary network system.

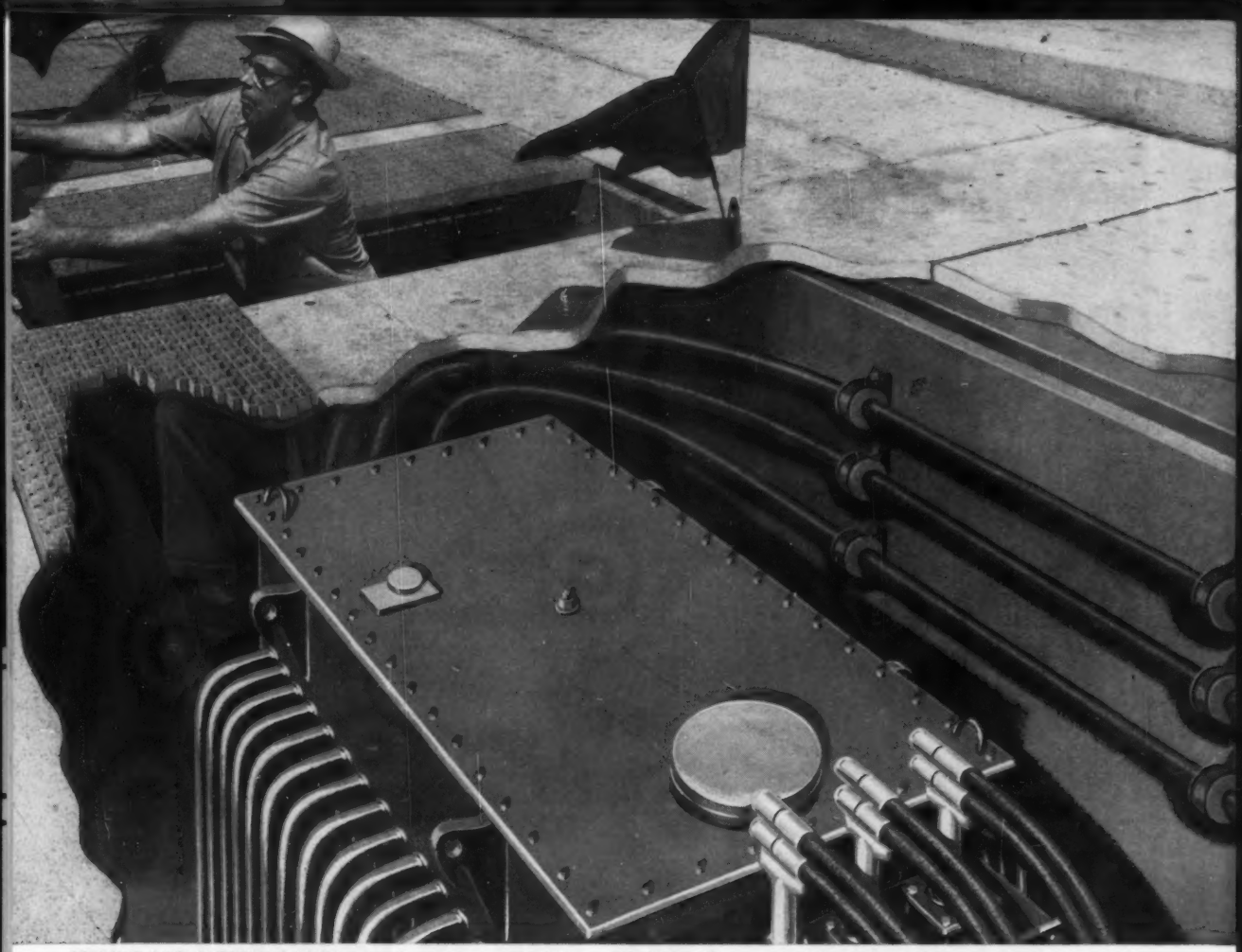
Duke Power Goes to Network



POWER is provided by two 1000-kva network transformers, installed in a vault on the present radial system. Compact units minimize vault size . . . submersibility protects against flood damage.



IT PAYS TO START A NETWORK . . . Future increases in capacity require less investment with a network system than with a radial system—the sooner you start a network, the lower its ultimate cost.



PRESENT AND FUTURE LOADS in the downtown area will be served by G-E network transformers like the two installed in the vault adjacent to the Jefferson Standard Life Insurance Building. Now part of the radial system serving the area, the transformers can be easily connected into a network system when it becomes desirable.

Transformers on Radial System

New installation in downtown Charlotte meets present loads, paves way for eventual conversion to secondary network system

In downtown Charlotte, N. C., the Duke Power Co. was faced with today's familiar problem—how to meet most economically the growing demand for power.

After careful study, and consultation with General Electric application specialists, Duke engineers installed G-E network transformers on the present radial system. Here are the three benefits gained:

1. **Maximum flexibility.** Duke engineers can continue to operate the radial system, or can reconnect into a network system if the load grows further.

2. **Low cost expansion in the future.** Cost of converting to a network will be low—the network transformers are already installed, there's provision for mounting network protectors at a later date, and cabling is the same. Cost of future expansions will be low—new load and new transformers can be added to a network system without making additional system studies.

3. **Increased dependability.** The transformers are underground, safe from buffeting. And they are submersible—important since water may flood the vault.

Savings for You—For help in estimating the savings a network makes possible, call the nearest G-E Sales Office, or write for Bulletin GET-2432. General Electric Company, Section 435-11, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Mr. Thompson with one of their "new-looking" 20-year poles.

Pressure-Creosoted poles installed in 1916 still in service!

• The length of service received from any type of equipment is usually the truest test of its value and real cost. This is certainly the case with pressure-creosoted utility poles. Take the record of the Iowa-Illinois Gas & Electric Co., of Davenport, Iowa.

This utility, which serves 100,000 residential and commercial customers in both urban and rural areas, has been using pressure-creosoted poles for a long time. "Creosote-treated poles last even longer than we had expected when we originally purchased them. We've been using them since 1916 and still do not know when a creosoted pole can be called old," says Mr. William Thompson, construction supervisor. "Many of our oldest poles have been removed from their original locations. In at least one case that I can recall, poles installed in 1923 were pulled out of a 25-mile stretch in 1944, found to be in excellent shape and reinstalled in rural areas in 1945."

Mr. E. F. Miller, manager of Iowa-Illinois Electric Transmission and Distribution Division, adds, "In 1945 and 1946, we pulled out about 300 creosoted poles that were over 30 years old. Only 3 poles had to be junked . . . the rest were put back into service in various rural lines."

A good record? Certainly, but not unusual when you use utility poles pressure-treated with a good grade of creosote—like USS Creosote. For more information on this quality wood preservative, contact our nearest sales office or write to United States Steel Corporation, 525 William Penn Place, Pittsburgh, Pa.

You can obtain clean pressure-creosoted poles upon specification without sacrificing pole service life.

USS CREOSOTE

5-1884

SALES OFFICES IN PITTSBURGH, NEW YORK, CHICAGO, CLEVELAND, SALT LAKE CITY AND FAIRFIELD, ALA.

USS

UNITED STATES STEEL

Florida Utilities Plan A-Plant

. . . with privately financed 200,000-kw reactor; Pacific G&E will install a 5,000-kw pilot reactor in San Francisco area

Three Florida utilities are planning a privately-financed central station nuclear power plant in the Tampa Bay area and a smaller 5,000-kw installation is being planned for Pacific Gas & Electric Co's system in California.

Florida Power & Light Co, Florida Power Co, and Tampa Electric Co have signed up Babcock & Wilcox Co, Allis-Chalmers Manufacturing Co, and Stone & Webster Engineering Corp engineers to design and build their 200,000-kw reactor, probably a bismuth-graphite plant. Other designs will be explored, however.

AEC Chairman Discloses Plan

The companies have not yet applied for a license from the Atomic Energy Commission, for there are long months of planning ahead. However, their negotiations were disclosed in Washington recently by AEC Chairman Lewis Strauss during questioning by the Joint Congressional Committee on Atomic Energy.

A Florida Power Co spokesman said the plant will be needed by 1962 or 1963 because of the rising cost of fuel oil, which fires most Florida power plants. Power costs in the state run 35-38 cents per million Btu.

Tampa Electric has already signed a contract for coal at one plant, and the other two firms in the atomic energy venture have sent out letters of intent for natural gas provided the Federal Power Commission approves an application to run a gas pipeline into their service areas.

Tampa Bay Region a 'Natural'

Location of the plant in the Tampa Bay area is a logical step, since the service areas of the three companies converge there. The three are interconnected.

The Florida plant would be the seventh big central-station nuclear plant for which a license would be requested. It would boost to more than 1-million kw the amount of nuclear generating capacity planned by private firms for the next five or six years.

The Florida facility is the biggest yet announced—next largest all-nuclear plant is Commonwealth Edison Co's 180,000-kw boiling water reactor—and financing, according to present plans, will be handled entirely with private funds.

In Schenectady, N. Y., meanwhile, General Electric Co disclosed plans to build a 5,000-kw boiling water reactor for Pacific Gas & Electric Co near San Francisco, Calif.

PG&E's installation would pump power into the company's system, but it would also serve as a pilot model for the boiler GE is designing for Commonwealth at Chicago. GE will build the nuclear part of the PG&E plant, and the utility will install the turbo-generator. Costs will run between $3 million and $4 million.

Utility Heads Explain A-Power Plans

Presidents of three Florida utilities have explained the thinking behind their joint plan to feed atomic power into their systems. Their comments:

W. J. Clapp, president of Florida Power Corp—"We feel that now is the time to make a thorough study of the possibility of using atomic energy. We are eager to find the best answers because we realize our responsibility to our customers to utilize the lowest cost fuel available."

Robert H. Fite, president and general manager of Florida Power & Light Co—"More than a score of our key personnel have been cleared by the Atomic Energy Commission to study confidential information on the subject. We feel this agreement is timely and are hopeful that it will hasten the time when it will be economically feasible to build a major nuclear power plant. . . ."

W. C. MacInnes, president of Tampa Electric Co—"Florida's remarkable industrial growth makes it imperative that we seek an abundant supply of fuel that is not subject to the price fluctuation or the transportation difficulties attendant to the importation of fuel oil."

The fuel oil which is presently used at all Florida power plants must be shipped in from Gulf and Caribbean ports.

New Stream Pollution Bill Would Broaden Controls

Hearings before a House subcommittee this week may tell whether a new compromise plan to broaden federal stream pollution controls will make the statute books this year.

The compromise, a refinement of controversial points of a bill passed by the Senate last year, was hammered out in behind-the-scenes talks during the summer recess and put in bill form by Rep John A. Blatnik (D-Minn.).

Blatnik heads the House public works rivers and harbors subcommittee, which has lined up some 40 witnesses—federal and state pollution control officials, wildlife protectionists, industry spokesman—for hearings on the measure March 12, 13, 14.

The new measure seeks—through more rigid procedural safeguards—to keep federal enforcement against industrial polluters to a minimum.

The bill is designed to overcome fears of state authorities and industry that federal health officials will force clean-up projects on stream polluters before the state authorities and industry can work their own solutions.

Blatnik's bill also contains provisions concerning the federal pollution agency—U. S. Public Health Service. It retains the Senate's language giving USPHS power to take interstate stream polluters to court, but only after consent of the state in which pollution originates or on request of the downstream state receiving pollution.

The new House bill for the first time authorizes a sizable federal fund for municipal sewage treatment construction—$100 million a year (up to $1 billion total) which cities have to match with funds of their own.

Three EEI Technical Committees Report . . .

Advances Made by Utility Industry

- **Fuel meter automatically measures pounds of coal per Mwhr of power plant output.**
- **One meter proposed for all installations.**
- **Light weight plastic poles proposed for distribution line application.**
- **EEI well launched on National Mutual Assistance Plan for major emergencies to supplement existing sectional programs.**
- **Auxiliary system poses design problems in nuclear power plants.**

Details of these and other key topics discussed by Meter and Service, Transmission and Distribution, and Electrical Equipment Committees of Edison Electric Institute appear on the following pages.

Three digressions from the conventional modes of metering marked the meeting of the AEIC-EEI Meter and Service Committee at Cleveland, Feb. 20-22. They were:

1. A method of measuring pounds of coal per Mwhr of power plant output.

2. A method for transferring circular chart readings to punch cards.

3. A single universal meter was proposed for all common 2 and 3-phase applications that would also be usable for conventional 3-wire single-phase service.

First of these developments was described by John F. Cook, Cleveland Electric Illuminating Co. An experimental installation for a 75-Mw unit at Lake Shore Plant records the number of 400-lb weight hoppers of pulverized coal consumed to produce 40,000 kwhr output. Coal hopper impulses advance a printometer wheel so that printing at each 40,000-kwhr impulse records lb of coal per Mwhr and spacing on the tape indicates elapsed time. Experience with this installation, said Cook, has already helped detect and correct inefficient operation.

A printometer also figures in the device described by William Cotter, also CEI, for transferring demand meter chart readings to punch cards. Method here comprises aligning a viewing slot on a modified recording-meter pointer with the peak on the demand chart. Movement of the meter pointer sets the type wheels of the printometer so that depressing a contact causes them to print on tape the kw demand reading. The tape is fed into the card punch to prepare cards for analysis.

The universal polyphase meter was proposed by C. V. Morey, Consolidated Edison Co. Essentially a 2½-element network meter, simple reconnection at its terminals would permit its use with correct registration for 120/240-v 3-phase 4-wire; 120/208, 240/416, and 265/460-v 3-phase 4-wire; 120/240 and 240/480-v 2-phase 5-wire; and 120/240 or 240/480-v 1-phase 3-wire service. Socket mounting is possible but introduces difficulty for 2-phase application. Morey urged careful consideration of the potential advantages of adopting a single meter for all common applications. Mass production with acceptable accuracy by automatic machines would offer possibilities of low cost. And its flexibility would guard against future obsolescence.

Support Universal Meter

Support for the universal meter came from G.B.M. Robertson, Philadelphia Electric Co, who reported successful standardization on 30-amp 240-v 2-phase meters for both 5-wire 2-phase and 4-wire 3-phase service. J. A. Morris, American G&E Service Corp, also hailed the proposal as another opportunity to pioneer in metering progress. And W. H. Farrington, Texas Electric Service, showed how a universal meter could be applied with socket-connected current transformers to nearly every power metering installation.

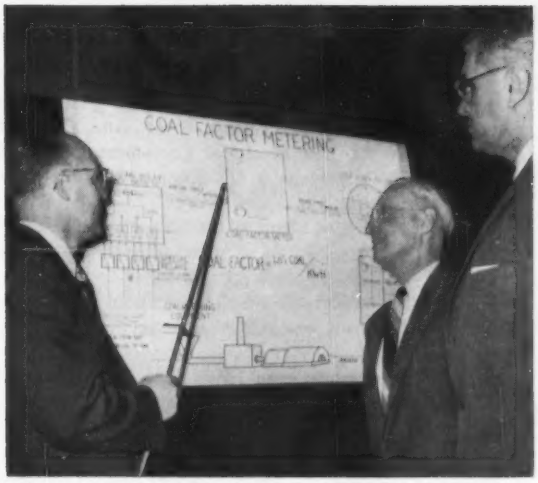
Metering for the largest load in utility history was described by J. A. Morris. Specifications for the 1,800-Mw service by Ohio Valley Electric Corp to AEC's Portsmouth Area Project required accuracy to within 1% for all loads from small "dry run" requirements to the contractual maximum. Complications were introduced by variable power flow in lines which double as ties between interconnected utilities and by the need for hourly readings of all lines with distinction between interim power, firm power, and excess power demands. Solution was found, said Morris, in modifying existing pulse totalizing devices for higher pulse rates and storing pulses during hourly printing operations.

Other Utilities Adopt 200-Amp Service

Load growth in residential areas has prompted Salem, Ore., to follow Spokane's adoption of 200-amp service entrance facilities, reported Lloyd Janz, Portland GE Co. Similar action is expected this year in Portland. With average residential consumption up to 7,645 Kwhr last year, many service drops now use 2/0 aluminum.

Provision for by-passing meter sockets when meters are removed for testing may become necessary, warned W. Jordan, Consolidated Edison Co.

The possibility of cutting testing expense was cited by



JOHN F. COOK EXPLAINS COAL METERING for a 75-Mw Cleveland generating unit to R. B. Swallow, AEIC chairman and G. J. Yanda, EEI chairman, of the Meter Committee

Lawrence Jones, Kansas City P&L Co, as additional incentive for scrapping obsolete meters. His company expects to complete elimination of uncompensated meters this year. But others see economic loss in precipitous replacement of old meters, particularly in areas where rewiring for heavy appliances cannot be expected.

Standardization activities passed a major milestone with acceptance of a proposed new standard for single-phase watthour meters.

Meter engineers are closer to agreement on standardized reporting of meter accuracies as determined by routine test. Their hope is to accumulate a sufficient mass of data to guide proper scheduling of testing and evaluation of performance.

Enthusiastic endorsement of the standardization work of meter engineers featured R. M. Besse's luncheon speech. The Cleveland vice president cited competition as requiring close attention to utility costs. He urged more research and sound organization geared to recognition of people. Utility operation has always shown character, he said, but that credit cannot as consistently be given to financing.

TRANSMISSION & DISTRIBUTION COMMITTEE

News that light-weight fiberglass poles and crossarms for distribution service have been produced was disclosed at the recent meeting of the Edison Electric Institute Transmission and Distribution Committee at Philadelphia.

A representative pole 35 ft long weighs about 150 lb and has Class 6 strength according to W. R. Bailey, Gar Wood Industries, the manufacturer. Made of epoxy resin and fiberglass, the poles were described as rot and fungus proof. They are hollow, have a 1/10-in. wall thickness and are said to stand 25,000-lb column loading and to have ample torsional strength.

Utilities working through EEI are well started toward a National Mutual Emergency Assistance Plan that will supplement, but not replace, five existing local and sectional plans. A survey by the T&D Committee's task force on mutual assistance reported by D. F. Tullock, chairman, showed the industry ready to form such a national plan. The task force drew on the findings of the survey to recommend in part:

1. That a tentative roster be set up immediately using information available.

2. That a National MA plan be adopted within EEI that would be voluntary, and supplement but not replace local and sectional plans. It would pledge companies to cooperate—but without jeopardy to their own service—in emergencies.

3. That the principle of direct communication between companies be preserved but that information coordinators be set up to track storms and pass on damage estimates.

Boston's Emergency Plan Detailed

The kind of plan for meeting future major emergencies now in force in one recently storm-ravished system was reported by D. F. Tulloch, Boston Edison. Boston's plan calls for decentralization of operations in the four divisions into 36 areas. Each has its own area crew supervisor and group crew supervisors to direct line, tree, and salvage crews. Area supervisors report to division supervisors and they to a company control center directed by the head of the overhead section. This center is the hub around which restoration turns. It's job is to effect rapid restoration and record progress for control and information purposes.

Trouble of quite another kind, in the form of cable failures, has been occurring at an increasing rate, industry-wide, since 1945, Howard Davis, Philadelphia Electric Co, told the committee. For cables operating above 7.5 kv, failures per 100 miles have climbed from 6.9 in 1945 to 7.9 in 1954.

Mechanical damage accounted for 46% of the 1954 failures, corrosion 23%, inherent weakness 6%, miscellaneous causes 13%, and unknown 12%. The industry has held its own for ten years on corrosion with a rate of 1.8 failures per 100 miles but is losing ground on mechanical damage. The 1954 rate was 3.6. Joint troubles too are on the increase with a failure rate of 1.7 per 1,000 joints in 1954, Davis said.

On the Con Edison system, mechanical damage to lead-covered underground cable is the largest major cause of cable and joint failures, according to F. P. West. Opportunities for reduction lie in improving size and shape of manholes, using cables that withstand expansion and contraction better, and limiting damage to joints in manholes and to cables during installation, he said. Necessity of installing larger cables today in smaller ducts of older systems contributes to cable damage, West concluded.

Cable Corrosion Combatted

Corrosion accounted for 39 cable failures experienced on the Philadelphia Electric Co system's 1,921 miles of paper-insulated lead-covered duct-lay cable above 7.5 kv. Anodic corrosion traceable to stray current and galvanic cells accounted for the majority of the failures, according to J. E. Johnson and R. C. De Marco. Galvanic corrosion is the most troublesome, they said. To combat it, cathodic protection is applied in three ways: using a point-type anode, a distributed (buried) anode, or an anode in the spare duct of a conduit line.

Savings approaching $700 per unit can be made by simplifying and reducing the number of accessories specified on modern network transformer, J. A. Pulsford,

Public Service Electric & Gas Co, said in discussing the proposed new EEI-NEMA standard. With hermetic sealing of units filled with inhibited oil, leakage and oil loss are eliminated. Nitrogen blanketing and elimination of moisture contamination are possible. As a result, he said, there is no need for oil level indicators, filter press connections, drain valves, or oil sampling valves. He also called for elimination of the traditional 3-position switch and of dual standards in the EEI-NEMA proposal.

Reviews Brush Control Progress

Opportunities for savings above ground were evident in review of chemical brush control progress in the eight years since its introduction. According to F. A. Ashbaugh, West Penn Power Co, brush control has brought a 60% reduction in utility right-of-way maintenance cost. In the next decade, he predicted, today's problem with tree trimming will be successfully handled in much the same way that brush has been brought under control.

The joys and the jaunces of furnishing electric service to a 12,000-acre residential development like Philadelphia's Levittown, which in 5 years grew from 400 farm homes to 28,000 residences, were traced by Horace MacVaugh, Philadelphia Electric Co. By the end of 1956, he said, PE will have installed 2,000 transformers—averaging 25 kva in size—28,000 service loops, 35,000 meters, 7,000 street lights, and 26 new 4-kv circuits.

He estimated peak demand as 50,000 kw and average annual revenue per residential customer as $125. Demand per house was originally estimated at 1½ kw per home, over the peak. With three transformer sizes used, 15, 25, and 37½, 1952 design called for 9 customers on a 15, 18 on a 25, and 28 on a 37½. In 1956 300 more homes are projected most of them with complete air conditioning. Design for these calls for 8 on a 37½-kva unit, MacVaugh said.

Apply Series Capacitors Carefully

Cautions in applying low-voltage capacitors in series with distribution transformers were sounded by General Electric's G. C. Auer. He pointed out the low power factor. Although benefiting a large motor customer, they can create flicker due to excess voltage rise for others near the transformer, he said. Moreover, such capacitors are subject to high current when faults occur on the secondary of the transformer. Secondary fault current can be serious when line and transformer reactance equal capacitive reactance of the capacitor. Ferro-resonance can also be a problem. But trouble can be avoided under steady state conditions if transformer exciting current is held under 2% for a 5% capacitor.

A proper approach to the problem of loading constant current transformers with mercury vapor and fluorescent street lights can bring considerable economies, W. A. Zander, Detroit Edison, said. But to gain these economies three factors must be recognized that influence load capability of any transformer: input kva, impedance, and power factor of the load.

Accidents continue! Electric utilities rank 26th in the National Safety Council listing of frequency rates for various industries. The utility average is higher than the national average. These unpleasant facts were driven home by R. H. Coleman, Baltimore Gas & Electric Co, as evidence that accident prevention in the electric utility industry needs attention.

ELECTRICAL EQUIPMENT COMMITTEE

Main problems encountered in designing in-plant power systems for the Shippingport Nuclear Power Station centered around the auxiliary system, E. M. Gue, Duquesne Light Co, told the EEI Electrical Equipment Committee at Hot Springs, Va., recently. At Shippingport there were two main problems.

1. Serving a load of about 10,000 kva with highest utilization voltage being 2.4 kv and at the same time providing acceptable voltage drop on load transfer.

2. Providing adequate reliability including power for emergency shutdown, and other requirements imposed by reactor plant.

Because high temperature liquid flows in the air gap of the canned rotor main coolant pump motors, Class H insulation is used. With this type insulation it was inadvisable to extend the range beyond 2.4 kv.

Auxiliary system is fed by two transformers. One transformer is supplied by the 138-kv switchyard bus, and the other is tapped off the 15.5-kv generator main leads. Both are three winding transformers each secondary winding feeding a section of 2.4-kv auxiliary bus.

Give Distribution More Thought

System planning and fire protection were other key committee topics. W. E. Slemmer, Ebasco Services, Inc, said that with today's rapid growth in residential and rural loads, more attention should be given to distribution problems. He had these suggestions on planning:

1. Planning should begin with the customer.

2. Public relations are important. Customers should feel that their requirements are of prime importance.

3. Flexibility is important. Load of an area changes and so does its character at times.

4. Make sure your plant is modern. Keep up with development of the art and consider imaginative and creative engineering.

Columbus & Southern Ohio Edison Co has been required to do its planning in recent years on almost an emergency basis because of unprecedented system expansion. Despite this, its experience has not been fruitless, according to Fred Campbell. With a 13.2-kv distribution system it is much easier and probably less costly to obtain a site, construct, operate, and maintain one large area substation than several small substations required with a lower distribution voltage.

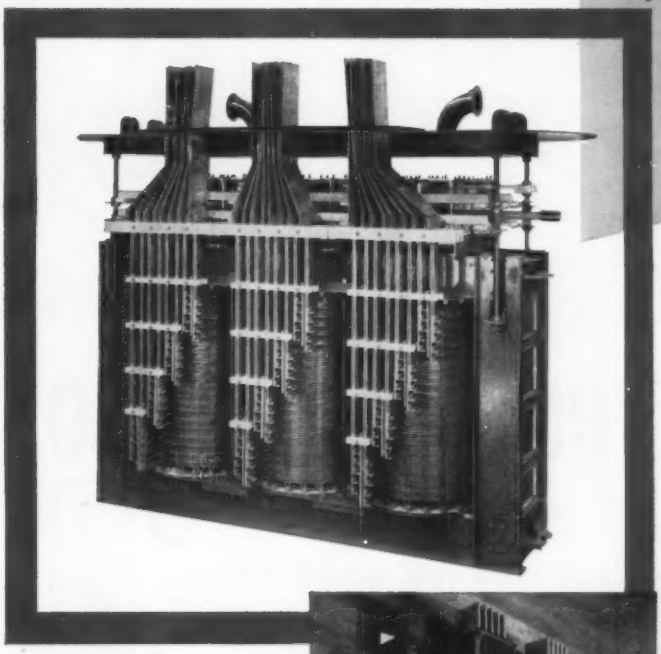
Coordinates Fire Protection

Virginia Electric & Power Co's fire protection program has been the result of coordinated efforts by production, insurance, and safety departments, according to J. R. Slack. Standardization was an important element, he said, pointing out that hydrant and hose connector threads were selected to conform with those of local fire departments. Experience has also favored use of 1½-in. rubber lined cotton hose instead of 2½ in. which is harder to handle with limited personnel.

J. R. Corcoran, Niagara Mohawk Power Corp, said his company's practice is to provide fixed protection in modern power plants for: outdoor power transformers, underside of turbine head ends, oil reservoirs, pumps and detraining equipment, oil filter tank and drum storage rooms, inside transformer repair bays, fuel oil pumps, and coal conveyor junction points.

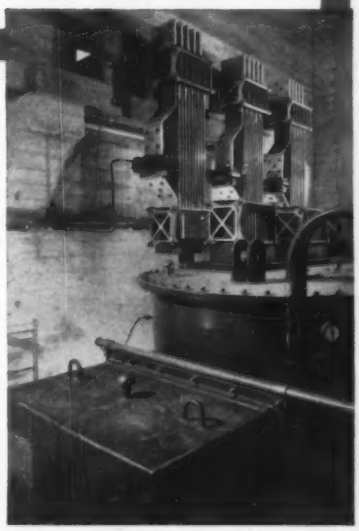
A Furnace Transformer Record by PENNSYLVANIA....

No Low Voltage Breakdowns in 20 years



Low voltage side of a 25,000 Kva Pennsylvania Furnace Transformer. Three phase, 60 cycles, water-cooled. High voltage: 13,800 volts. Low voltage: 430 to 290 volts. Maximum line current 39,000 amps.

●



18,750 Kva Pennsylvania furnace transformer in service at a West Coast steel plant. Three phase, 60 cycles, forced-oil/water-cooled. High Voltage: 6600 volts. Low Voltage: 375 to 144 volts. Maximum line current: 33,300 amps.

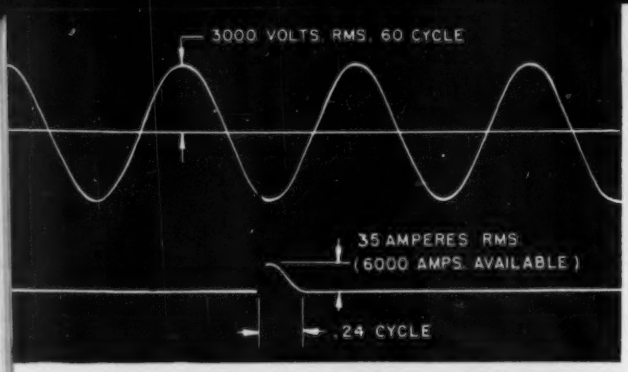
In 1936 Pennsylvania introduced a new type of helical winding in the low voltage coils of a 2500-kva furnace transformer. Since then, the same principles of coil design have been incorporated in scores of Pennsylvania furnace transformers. These furnace transformers have ranged in size from 250 through 25,000 kva, and from 3175 through 57,735 amps.

This wide range of sizes demonstrates Pennsylvania's complete familiarity and experience with furnace transformer application. Even more important, however, is the record of performance achieved over this entire range — a 20-year record which reveals that there has **never been a low voltage breakdown** on any Pennsylvania furnace transformer utilizing the exclusive helical coil design.

With a background such as this, in both experience and **proved performance,** Pennsylvania Transformer Company is well qualified to satisfy today's highly exacting furnace transformer requirements. Whether you buy your next furnace transformer separately or as part of an installation "package", why not make certain of long-range dependability by specifying Pennsylvania?

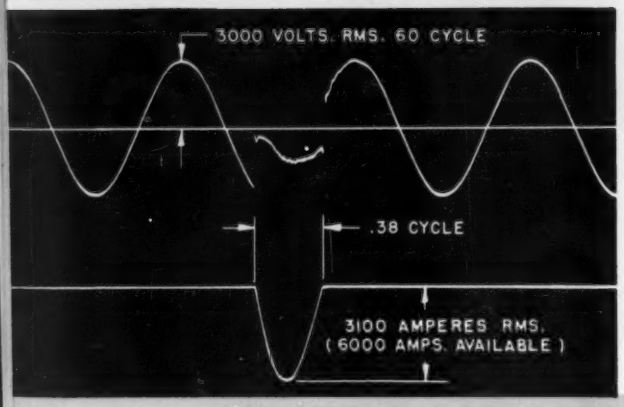
PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division • **CANONSBURG** • **PENNA.** • *Greater Pittsburgh District*

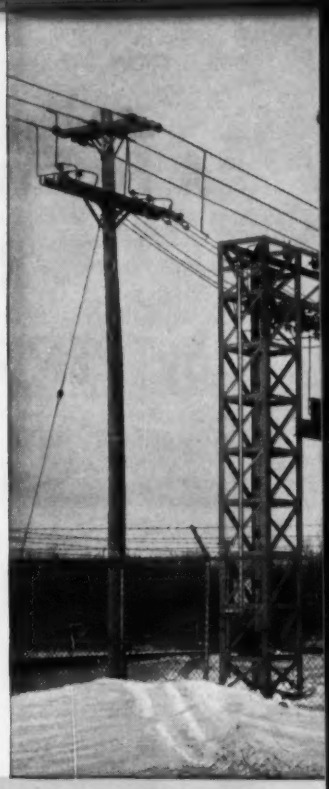


VALVE ARRESTERS HANDLE HIGH FAULT CURRENTS BETTER

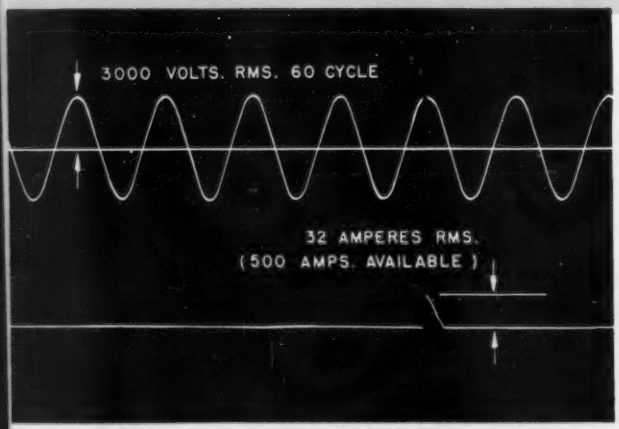
VALVE Type Arrester, on a 3000 volt, 60-cycle system, with 6000 amperes available, draws 60-cycle power follow current of only 35 amperes RMS.



EXPULSION Arrester, on the same system, draws 3100 amperes follow current—over one-half the available short-circuit current.

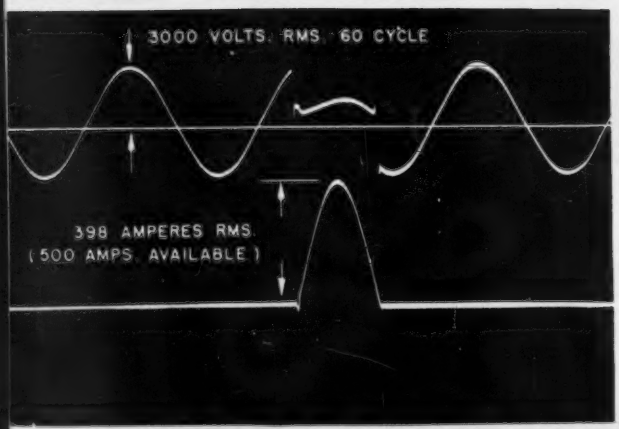


Valve Arresters Are Not

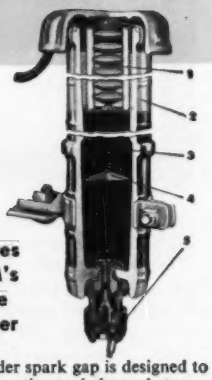


VALVE ARRESTERS HANDLE LOW FAULT CURRENTS BETTER

VALVE Type Arrester, on a 3000 volt, 60-cycle system with 500 amperes available, draws only 32 amperes, as shown in this oscillogram. And it interrupts the follow current in a half-cycle, or less.



EXPULSION Arrester, on the same system, draws 398 amperes. An eroded expulsion arrester may not develop enough pressure to clear the arc—and a sectionalizing device would operate unnecessarily.



Features of L-M's Valve Arrester

1. The ladder spark gap is designed to provide an optimum balance between 60-cycle sparkover and impulse sparkover.

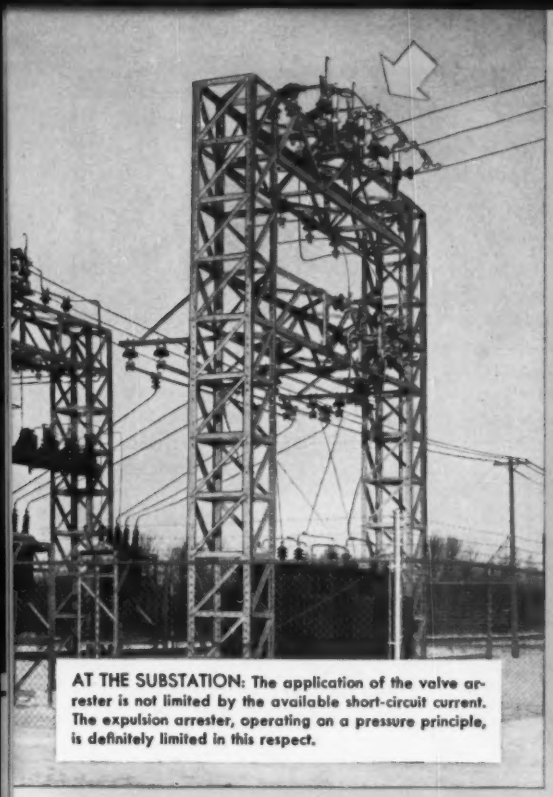
2. The Pyrex glass housing permits visual inspection to detect mechanical or electrical damage.

3. "Granulon," the valve material, is able to withstand severe heating which accompanies heavy strokes of lightning.

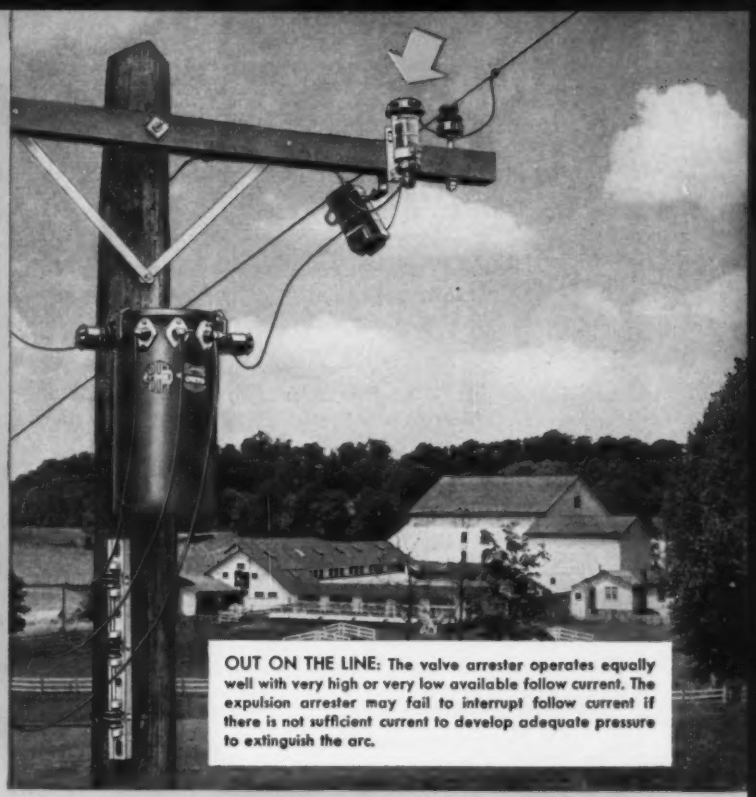
4. Lens-shaped electrodes in the element compensate for "skin effect," assuring uniform distribution of surge current throughout the valve element.

5. L-M's exclusive "Isolator" gives positive assurance against grounding feeders by instantly disconnecting the ground lead from the arrester if the arrester should ever become damaged.

LM® LINE



AT THE SUBSTATION: The application of the valve arrester is not limited by the available short-circuit current. The expulsion arrester, operating on a pressure principle, is definitely limited in this respect.



OUT ON THE LINE: The valve arrester operates equally well with very high or very low available follow current. The expulsion arrester may fail to interrupt follow current if there is not sufficient current to develop adequate pressure to extinguish the arc.

Affected By System Capacity

...Another Reason Why Valve Types Are Better Than Expulsion Arresters

by **RALPH H. EARLE**
Chief Engineer
General Products
Line Material Company

L-M engineers have made thousands of tests and observations of the performance of both valve and expulsion type arresters. They have worked closely with operating companies on comparative tests. The inescapable conclusion is that the valve principle results in superior arrester performance.

One of the major advantages of valve type arresters is that they are no respecters of system capacity. They work equally well at the bus of the largest generator made, or at the most remote point of a rural line.

This is not true of expulsion arresters. They pass far more power follow current, and erosion on the expulsion arrester is rapid, life is comparatively short.

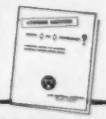
Valve type arresters work equally well on small surges, and on systems with very low fault currents. In such situations an expulsion arrester may take several cycles to interrupt follow current. A badly eroded expulsion arrester may not work at all, thus blowing the sectionalizing fuse, or causing unnecessary recloser operation.

When 60-cycle system capacity is considered, valve arresters are preferred because:

- **A** the valve arrester has unlimited 60-cycle capacity. It operates equally well with very high or very low available follow current.
- **B** valve arrester life is completely independent of 60-cycle system capacity.
- **C** the expulsion arrester, which operates on the pressure principle, may explode because of pressures developed if its fault current rating is exceeded.
- **D** the expulsion arrester may fail to interrupt follow current if there is not sufficient current to develop adequate pressure for arc interruption.

Why This Policy

When a manufacturer of two types of arresters adopts a policy of recommending *one* of the two types, there must be a good reason. The facts behind this policy are given in a new bulletin, "Valve Versus Expulsion Type Arresters." Ask your L-M Field Engineer for a copy, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Co. Div.).



FOUR PRINCIPAL REASONS
For Recommending Valve Over Expulsion Arresters

1. Better Protective Characteristics—The valve arrester sparks over more quickly and at lower voltages on lightning surges.

2. Unlimited 60-Cycle Capacity—The application of the valve arrester is not limited by the available short-circuit current.

3. No Fuse Coordination Problems—The valve arrester will pass relatively small values of 60-cycle follow current, regardless of system capacity.

4. Longer Life—The valve arrester is electrically and mechanically unaffected in handling lightning discharges usually encountered in service. Its life is relatively unlimited.

MATERIAL Lightning Arresters

Santee-Cooper Probe Ended

. . . by investigating committee's majority and minority reports; group splits on financial trouble cause, Jeffries' management

The investigating committee probing the 1954 financial difficulties of Santee-Cooper (South Carolina Public Service Authority) has agreed on the state power agency's solvency but has divided on causes of the financial trouble.

Majority and minority reports, the result of more than five months of public hearings conducted by the nine-member legislative-governor's committee, indicated agreement on further supervision of Santee-Cooper by the state power agency's board. The group split, however, on the effectiveness of State Sen R. M. Jefferies' management as head of Santee-Cooper.

Majority Conclusions

The majority, composed of 5 members, concluded that:

1. The 1954 drought, preceded by four dry years, was main cause of the "financial crisis."

2. Contributing factors were the estimated damage of $250,000 from Hurricane Hazel, a $1,250,000 cost overrun on a steam plant, and a $250,000 cost overrun on a new office building, which the majority deemed necessary.

3. Insolvency was improbable in the foreseeable future and ". . . the Authority has met all of its current obligations and will meet its obligations for the fiscal year 1955-56."

4. Jefferies met the financial difficulty in a "forthright manner."

5. Jefferies, as general manager, was "not violating any law or constitutional provision with reference to dual office-holding."

Minority Findings

The minority group's report blamed principal financial difficulties on a contract with Central Electric Cooperatives, Inc, which provided that Santee-Cooper sell power to Central at 6 mills per kwhr, or less than cost. The rate, increased temporarily to 6.4 mills last year, was considered too low by the committee. The group pointed to a state law requiring that power not be sold by Santee-Cooper at less than cost and criticized Jefferies for signing the contract.

Under this 35-year contract, Santee-Cooper would pay Central a rental for using the co-op's transmission system, equal in amount to installments due on Central's loan from the Rural Electrification Administration. At the end of the 35 years Santee-Cooper would gain title to the transmission lines.

"Entering into such a long-term contract to sell and deliver power at a fixed price based on current cost with no provision in the contract for future adjustment based on future cost is evidence of poor management . . .", the minority report stated.

Other conclusions reached by the minority group were:

1. That Jefferies' dual office-holding as state senator and general manager of Santee-Cooper violated "the spirit of the Constitution." Two committee members, Reps J. M. McLendon and H. C. Edens, accompanied the report with a bill in the House which would prohibit a legislator from being an employee of Santee-Cooper.

2. That management's "failure to map a long range financial program" to meet setbacks such as hurricanes and drought losses was main factor of the financial distress, not the drought itself.

3. That the office building overrun should have been detected although no blame could be placed for the cost overrun of the steam plant.

4. That Santee-Cooper's budget was "unrealistic."

5. That construction of the office building and purchase of lots for buildings at Conway and Myrtle Beach were "expenditures of large sums of money on un-essential projects which were more of a non-revenue producing character. . . ."

6. That management had failed "to use capable personnel to the fullest extent."

The majority report stated that there has been "no evidence whatsoever of any embezzlement, bribery, corruption, or misuse of any funds of the authority." And minority agreed that they had "found no evidence of misappropriation of funds."

The majority and minority reports, in agreeing that there was little likelihood that Santee-Cooper would resume its previous $200,000 profit payments to the state for several years, suggested priority in building up reserves.

It was agreed, too, that the 35-year contract of 1949 with Central should be renegotiated.

The contract, criticized in both reports for its low rates, was defended by Central Co-op Manager E. V. Lewis earlier in the investigation, who asserted that it would not be fair to farmers to increase the rates. He said Santee-Cooper was under no obligation to make money for the state and that the power development was created solely to provide the people of the state with economical power, plus other functions such as flood control and navigation.

Jefferies Calls Probe Necessary

Jefferies, in his report, "My Final Review," which preceded the recent committee report, called the investigation necessary "to disprove many of the charges which have been made against Santee-Cooper . . . Such will restore Santee-Cooper's credit, thereby helping the state as a whole."

Speaking to the South Carolina Senate the day after the committee's report was made, Jefferies said former South Carolina Gov James F. Byrnes was "fully misinformed over the situation" when he called for the investigation of Santee-Cooper in his farewell message to the legislature in 1955.

"If he had had the information the committee developed there would have been no reason for the investigation," he added.

Memphis Chooses Site for 750,000-kw Plant

A 300-acre tract about six crow-flying miles southwest of downtown Memphis, Tenn., has been chosen for the city's 750,000-kw steam power plant. The selection was announced by Maj. Thomas H. Allen, president of the city's Light, Gas & Water Commission.

The property, mostly farmland, is in Ensley Bottoms adjoining the Mississippi River's main channel and McKellar Lake. If the city is unable to purchase the site through negotiations, condemnation proceedings will be used, Allen said.

Construction will begin on the site as soon as the land is acquired, he stated.

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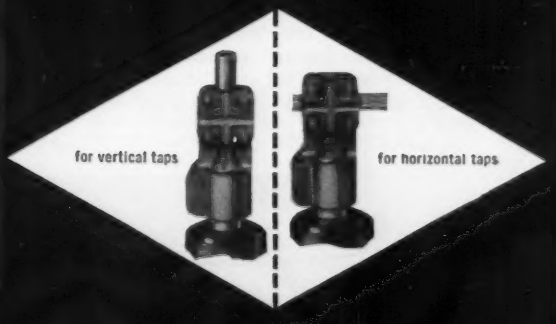
BURNDY RANGE-TAKING STUD CONNECTOR NDR—
12 sizes with the scope of a hundred . . . designed to meet E E I-NEMA specifications . . . to accommodate cable from #6 solid copper to 2,000 MCM copper; ⅜" copper I.P.S. to a 1¼" copper I.P.S. tubular bus and flat bar. Here's your chance to eliminate a lot of stock-keeping: these 12 items do the work of a hundred!

Constructed of high copper alloy, the NDR stud connector features a reversible cap that permits the full cable, flat bar, or tubular bus range to be taken either in line with the stud or at right angles to it.

Only one wrench is required for installation.



Write for Burndy advance catalog data sheet, Stud Connector Type NDR.

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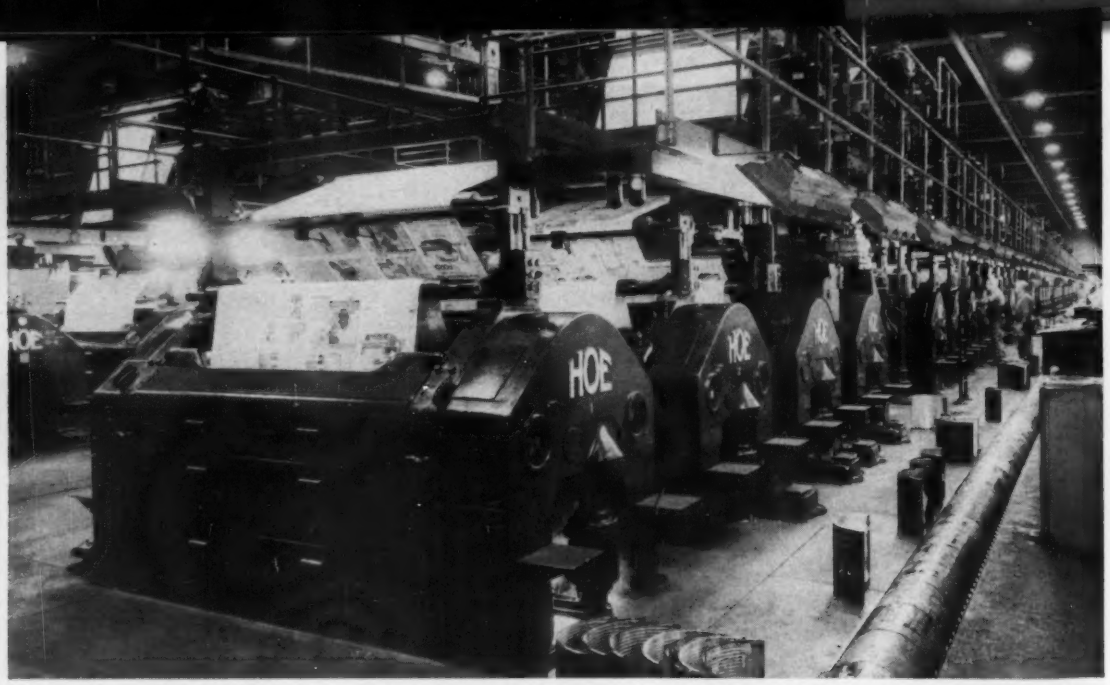


PRESS ROOM has longest continuous line of presses in world. There are two lines, each with 36 units

Electrical System Ups News Output

INDUSTRIAL Design

Modern design of Evening & Sunday Bulletin also assures greater uniformity in printing, boosts morale, cuts newsprint handling

LEON ALBERTSON, Market Studies & Service Division, Philadelphia Electric Co, Philadelphia, Pa.

Electrical system for the world's most modern newspaper plant is helping Philadelphia's Evening & Sunday Bulletin maintain its position as the country's standard-size evening paper of largest circulation. Also, the electrical system in the new plant is partially credited with increasing the output per manhour, providing a greater uniformity in printing, maintaining a low accident rate, boosting employee morale, and saving newsprint handling.

The new plant, occupying an area of 275 x 1,000 ft, includes a four-story office section, two-story stereotype section, one-story warehouse, and a three-story press room. All production lines are streamlined for maximum efficiency, and special consideration was given to design of the wiring system, load centers, controls, material handling, heating, air conditioning, ventilation, and lighting.

Electric service to the building is supplied through two 13.2-kv underground feeders. Each feeder, comprising three 500-MCM PLC cables in conduit, is capable of carrying full load requirements to the split bus having a 1,200-amp tie breaker. From both sides of the bus the 13.2 kv is distributed to five load centers through interlocked armored cable and 1,200-amp air circuit breakers.

Two of the load centers are for the press drives, one for the stereotype section, and two for building service. They supply power for 6,300 hp of motors, 1,480 kw of resistance heating, and 853 kw of lighting. All load centers are constructed of conveniently assembled units, to save space, and are placed close to the load.

Installed in the plant are 11,000 ft of interlocked

225-FT LONG load center for presses includes rectifiers and electronic acceleration control

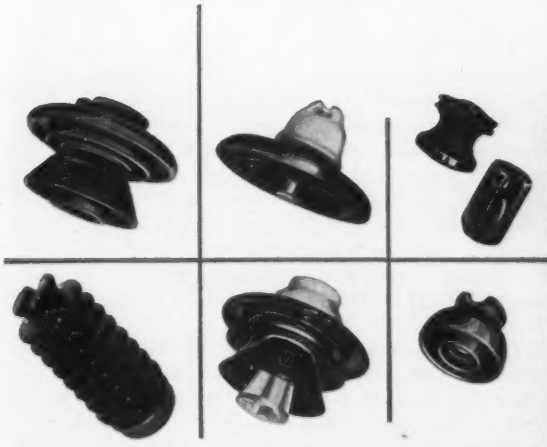
VICTOR PROGRESS REPORT 2

We make our own LIGHTNING to give you INSULATORS that last

Shown above is VICTOR'S 800,000-volt impulse generator in our modern electrical laboratory. This unit, together with VICTOR'S complete mechanical and electrical test facilities, enables our engineers to simulate the most extreme service conditions.

Included in this unit are a remote controlled gap spacing mechanism, an oscillograph for showing wave forms visibly on the screen of a cathode ray tube and a 4″ x 5″ camera for recording these waves on film for observation and study.

One more reason why VICTOR gives you insulators that last—that are design-tested to withstand lightning and other adverse service conditions. VICTOR'S modern plant, engineering and research facilities are unsurpassed in the field. You just can't buy better insulators!



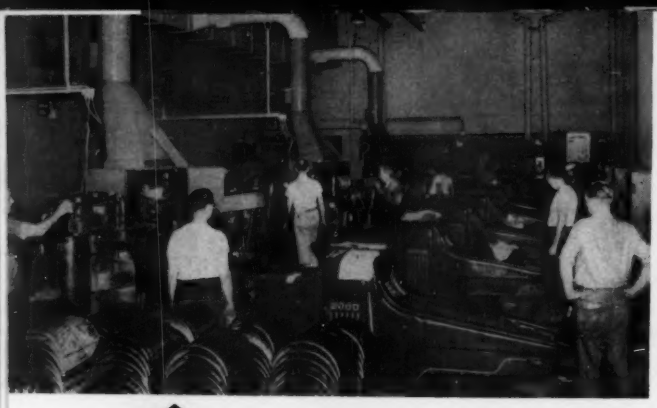
"BETTER INSULATORS THROUGH RESEARCH"

SPECIFY VICTOR

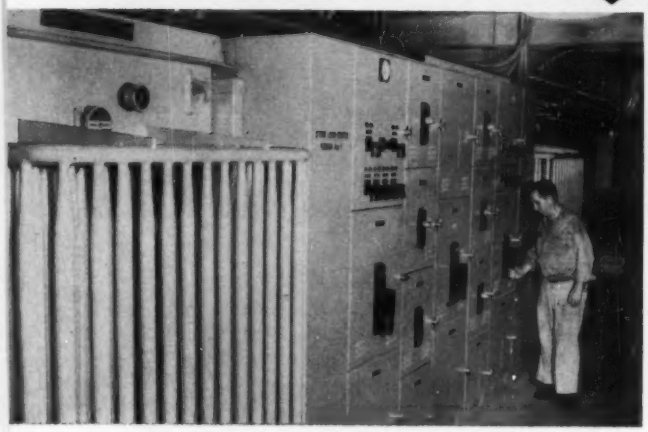
Purified Porcelain Insulators!

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain
Insulator Hardware



STEREOTYPE department has 1,480 kw of electric heaters and balanced air-pressure system to remove fumes. Service for equipment is supplied from 2,000-kw load center



armored cable, 240,000 ft of conduit, 28,000 ft of underfloor duct, and 2 million ft of wire. Armored cable was used wherever possible because it is easy to install. Underfloor duct provides service to hundreds of desks with power, communications, and supplementary lighting where required.

Power for the press room, having the longest continuous line of presses in the world, is supplied from two load centers, each with two 1,000-kva, 13,200-480-v transformers. Each center, in turn, supplies 36 40-hp press-unit drives and seven 40-hp folder units.

Presses and folding machines can be combined for runs of a selected number of pages by programming the run with individual selector switches located on a press-room control board. Then operation is controlled from any of the many pushbutton stations along the line of presses.

At each pushbutton station are six controls: Safe, run, stop, jog, fast, and slow. Depressing a "safe" button inactivates all other stations, and a green signal lamp lights indicating safe working conditions on press units. Any "run" button must be depressed before presses will operate. This extinguishes the green lamp and lights a red signal. When a button is depressed to start the press, a warning gong sounds.

Also on the press-room switch board are controls for motorized conveyors that carry stereotype plates to and from the press room and others that carry completed papers to the mail room for bundling and shipping.

An underfloor conveyor, 1,800-ft long, powered by a 15-hp motor carries newsprint from the rail siding to the temperature humidity-controlled warehouse and press room. Because the conveyor is beneath the floor, barriers or boxed-in areas are not required for safety; and cross traffic is not impeded. Material handling trucks can drive right over it. Besides conserving workers' energy and requiring little attention and maintenance, the greatest advantage of the conveyor system is the reduced spoilage and damage to newsprint.

At the old plant newsprint was trucked from the warehouse to the Bulletin. Elevators delivered the paper to the old press room on the basement floor. All this handling resulted in damage to the ends and body of the newsprint rolls. Damage has been overcome at the new plant through simplified handling and humidity control, thus contributing to printing efficiency and uniformity.

The stereotype department, supplied from a load center containing two 1,000-kva 13,200-480-v transformers, has three electric melting pots used in casting plates. Each pot has a capacity of 10 tons of metal and 360 kw of immersion heaters, which operate continuously to hold the metal temperature above 620F. Smaller pots of 2,550 to 4,400 w attached to each linotype machine and additional heaters on remelt furnaces increase the total heating load to 1,480 kw.

Advantages of Electric Heat

Factors influencing the decision to use electric melting pots were:

1. Effect of uniform temperature control on minimizing oxidation of molten metal.

2. Ease of installing immersion heaters and their long life.

3. Effect of heating on increasing power factor.

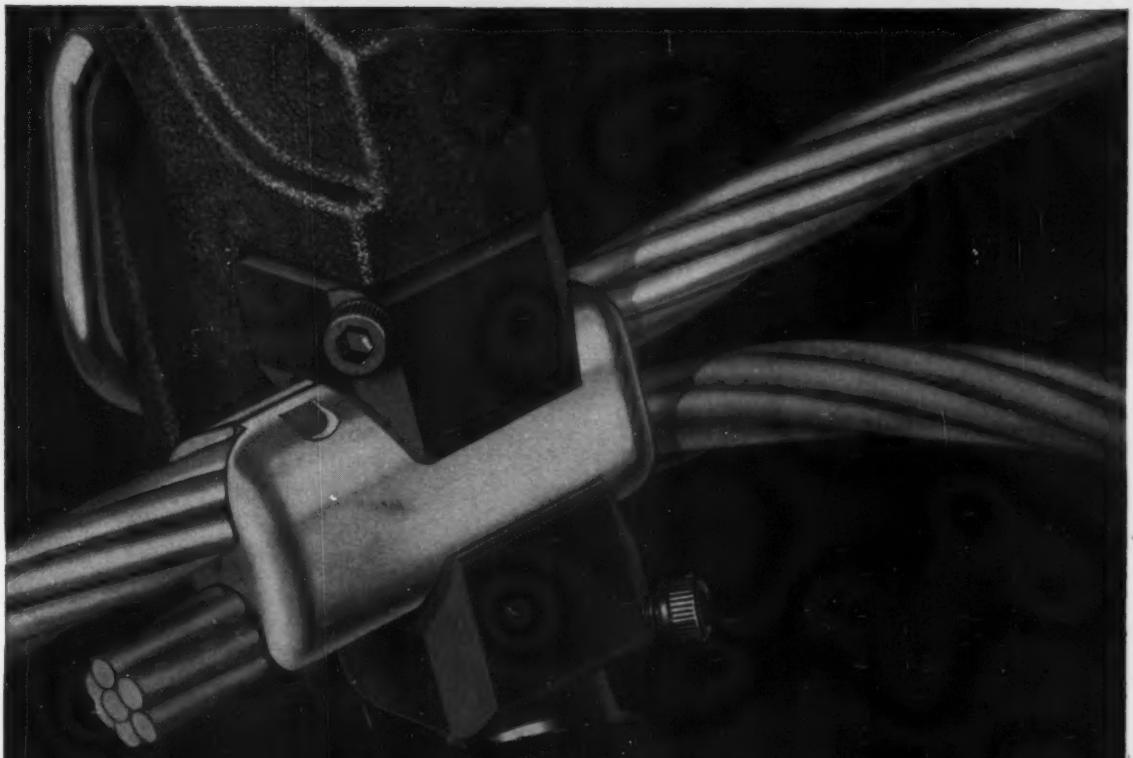
Fumes and excess heat from the melting pots are removed by a carefully planned ventilating system involving balanced air pressures. Fresh air is forced into the room while stale air is removed at a slightly faster rate to compensate for expansion as it warms up. This balanced air pressure eliminates air movement between departments, keeping ink-laden air in the press room from penetrating the stereotype section. This system has reduced maintenance of the building and equipment and creates comfortable working conditions.

The lighting system comprises 186 400-w color-corrected mercury-vapor high-bay units, 4,600 fluorescent fixtures, and 1,500 incandescent fixtures. Mercury-vapor units are mounted on disconnect hangers for easy maintenance. Fluorescent tubes are installed to meet individual requirements for tasks performed—two-tube 277-v units in industrial areas and two or three-tube 277-v slimlines in commercial areas. Some units are recessed, and others are mounted on trolley wire for positioning versatility.

Lighting in industrial areas is turned on and off by remote control through contactors. Low-voltage switching is used in commercial areas.

Careful planning has provided high-level illumination which is comfortable for all tasks, minimizes fatigue caused by eyestrain, reduces error, promotes better safety, and beautifies the building's features.

The electrical system was installed by Cates & Shepard, of Philadelphia, Pa.



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at less cost

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The exclusive "built-in spacer" eliminates the danger of corrosion or galvanic action. Conductors do not touch each other. Each is held around its entire circumference . . . separated by a metallic barrier. You can use versatile SQUEEZONS for copper to copper, copper to aluminum, aluminum to copper or aluminum to aluminum joints.

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The Mark of Quality

OPTIMUM INVESTMENT*
Power Transformers

*Optimum Investment

General Electric's assurance of lower long-term cost, plus greater dividends from your power transformer investment, through:

- **LOW ENGINEERING COST:** G-E field services reduce your engineering expense.
- **LOW PURCHASE COST:** Skill to produce optimum design for each application.
- **LOW INSTALLATION COST:** Upright shipment, one-piece tank speeds handling.
- **LOW OPERATING COST:** Constant characteristics for lasting economy.
- **LOW MAINTENANCE COST:** Product improvements and few failures reduce outages.

VAPOR-PHASE DRYING drives moisture from core-and-coil assembly before tanking. Hot oil vapor in high vacuum dries organic parts, preventing later oil contamination in service. Tightness maintains short-circuit strength.

LOCKING METHODS are special—only four are used. None depend on a cutting or shaving action that chips off metallic shavings. Insulation strength is not impaired by razor-sharp particles. Locking strip, shown above, is one method used.

How much are you paying for aging power transformer characteristics?

General Electric uses the special care necessary to help prevent losses and other characteristics from changing

Power transformers could age. Lightning and surge voltages, system fault currents, years of operating at varying temperatures, pick at the insides of a transformer. Parts could shrink. Braces and clamps could loosen. Then turn-to-turn, layer-to-layer, even lamination shifting (the latter causing interlaminar insulation wearing) could occur. Not readily apparent, this deterioration could reduce impulse and short-circuit strengths, increase core loss, exciting current, noise. Once started, the degeneration tends to be cumulative.

The result of deterioration is higher costs from increased losses and lowered failure resistance. Hence, care must be taken, extra care, to resist costly deterioration. General Electric power transformers have been redesigned, are built with special care to help keep characteristics at their original optimum values. Four examples of this care are: vapor phase drying, the patented process for removing moisture; the stress-resistant braces and clamps; the highly-compressed spacers; and the meticulous attention to locking of studs and bolts.

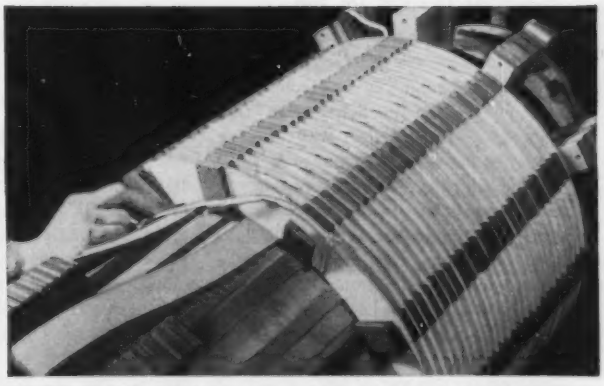
These are examples of features designed to give you economical operation. There are more. And, combined with other features that give low purchase, installation, maintenance, and engineering costs, they make your General Electric Power Transformer an *Optimum Investment.* General Electric, Schenectady 5, N.Y.

421-43

Progress Is Our Most Important Product

GENERAL ELECTRIC

ASSEMBLY BRACING gives positive pressure for spring-like rigidity. Stress-free clamping holds down core loss, retards abrasive rubbing of laminations. Full strength and low losses are maintained by clamping system.



KEYED WINDING SPACERS, of extra-dense pressboard, are pre-compressed at 24,000 p.s.i. After vapor-phase process removes moisture, adjustable clamps re-compress coil stacks. Spacers don't shrink, loosen, or slip out in service. Coils remain rigid and strong.

3 PEA Committees Meet

- Relay
- System Planning
- System Operation

Here Briefly Is What Happened . . .

A symposium on potential devices and a session on relaying and control of substations were features at the winter meeting of the Pennsylvania Electric Association Relay Committee at Philadelphia, Feb. 9 and 10.

Leading off the symposium on potential devices, Kenneth Winick, General Electric Co (formerly of Ebasco International Corp), listed several questions the answers to which relay engineers must know if they are to take advantage of the economics of potential devices. Some of these questions were:

1. What is equivalent circuit of potential device and what are values of the circuit parameters?

2. What equation should be used to calculate voltage across the protective gap on primary side of potential device?

3. Can ratio and phase angle curves be made available for the auxiliary windings?

4. What are the limitations in the use of potential devices, thermal and otherwise?

Potential Devices Do Job

In general the performance of potential devices on the Detroit Edison system has been quite satisfactory, according to H. W. Scheper of that company. He said that they do produce secondary transients on short circuit and are slower than potential transformers in responding to excitation, but neither of these limitations has been found detrimental to satisfactory relay performance.

One disadvantage of this equipment is that even under the most advantageous conditions, adequate testing requires the use of test equipment not normally carried by field engineers, such as oscilloscope or phase angle meter.

A. E. Flink, Ohio Edison Co, said that adjusting the carrier gap on capacitor potential devices is very important when impedance relaying is used. His company had repeated trouble with incorrect operation of impedance relays until the capacitor potential device manufacturer recommended that the carrier gaps be set at 3/32 in. to give a 60-cycle flashover voltage of from 5,500 to 6,300 v.

West Penn Power Co authors H. Denmead and S. E. Smith offered a simple, direct, accurate, and fast method to calibrate bushing and capacitor potential devices. By use of this method a set of devices can usually be set in one or two hours.

According to Smith, who presented the paper, each potential device is adjusted individually using a dummy burden made up of a phase angle meter potential coil, high resistance voltmeter, non-inductive resistor, and a condenser to balance out reactive component of the phase angle meter potential coil burden; total volt-ampere burden of the combination being equal to the watt component of the normal relay burden.

Pilot Wire Proves Good

Pilot wire relaying has proven to be very satisfactory on the Long Island Lighting Co system. J. R. Gummersall, in presenting a paper on relaying practices written by G. A. Powell, indicated that the leased circuits used for pilot relaying were out less than 0.1% of the time in 1955.

In a detailed description of their East Garden City substation Gummersall said the following protection was used:

66-kv buses—differential relays.

66-kv lines—HCB relays, instantaneous overcurrent relays as phase and ground fault detectors and supervisory relays.

66-kv line back-up—directional impedance and directional ground relays.

Underground 69-kv cable—same as 66-kv line except duplicate pilot wire circuits are provided.

Combined overhead and underground cables—same as overhead lines.

Transformer banks—percentage differential relays.

Conventional protective relaying was used at the 110-kv Arlington Substation of Virginia Electric & Power Co, said E. L. MacKay, Vepco. One interesting feature of station is that closing times of the two low-side transformer breakers are staggered by 2 sec. This allowed use of a normal size battery as each of the breakers draw about 180 amp at 129 v on closing.

In describing the relay aspects of Philadelphia's first center city 66-13.2-kv substation, W. M. Broome, Philadelphia Electric Co, said that because of excess pilot wire resistance and cost of carrier current protection the loop line at the station is protected by two individual but overlapping pilot wire circuits.

SYSTEM PLANNING COMMITTEE

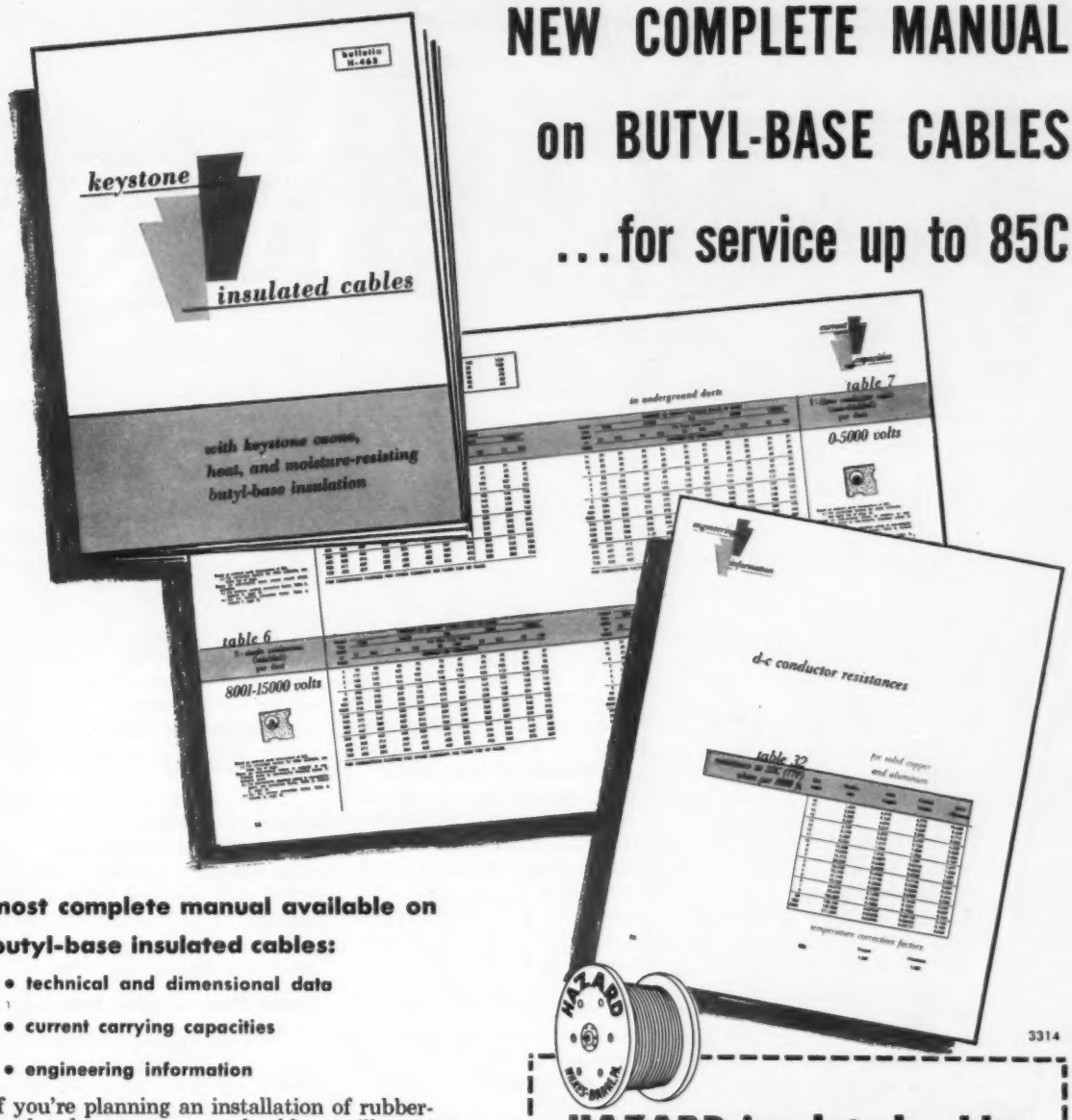
The time required to engineer a transmission plan for large generators is longer than for smaller units. At least one year should be allowed between the selection of the site and size of large units and the adoption of a transmission plan to handle an installation of 650 Mw. This was the advice of W. J. Cloues, Philadelphia Electric Co, at the Pennsylvania Electric Association System Planning Committee meeting at Pittsburgh, Feb. 20-21.

This greater planning time is required because the problems are larger than ordinary, each with a multiplicity of variables. Some of the more important problems are the need for strong interconnections, minimizing of breaker duties, adequacy of back-up relays, examination of stability considerations, need for reliable service to auxiliaries of super-critical boilers.

Capacity of the interconnection between two areas should be approxi-

(*Continued on page* 32)

NEW COMPLETE MANUAL on BUTYL-BASE CABLES ...for service up to 85C



most complete manual available on butyl-base insulated cables:

- **technical and dimensional data**
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If you're planning an installation of rubber-insulated power or control cable, you'll want to consult this new 48-page manual on Hazard Keystone cables. It is the most complete volume of technical information published on butyl-base insulated cables. In these pages you'll find:

Test data—ozone resistance, heat resistance, moisture resistance, test voltages, corona extinction levels, etc.

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Please send me your manual on Hazard Keystone Cables.

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PRODUCT OF OKONITE RESEARCH

J. A. ZIMMERMAN, Allis-Chalmers | A. G. MELLOR, General Electric | A. E. KILGOUR, Allis-Chalmers | W. U. BAUM, Pennsylvania P&L

3 PEA Committees Meet

(*Continued from page* 30)

mately equal to the size of the largest generator, said A. G. Mellor, General Electric Co. Such integration decreases the cost of generation expansion by 10 to 15% because the reserve requirements for a given generator size are decreased.

Ties Favor Large Units

Mellor also said that the optimum size of generators to be added to an unintegrated system of 2,000 Mw are between 7 and 10% of the system size (EW, Feb. 21, 1955, p 94). But with an interconnection the smaller percentage generator expansion becomes more favorable as the cost of the interconnection increases and as the outage time for planned maintenance increases.

These are some of the results of a study of two identical areas with and without a transmission interconnection. In the study, generators of the same sizes but ranging from 5 to 30% of the area generation were added to each area simultaneously to simplify calculations.

Other benefits from interconnecting such areas, Mellor said, are reduced installed capacity because of weekday peak load diversity, staggering of capacity additions, and economic exchange of power resuting from differences in incremental production costs.

Designers should be permitted to select the rated voltage for generators having direct-cooled conductors, said J. A. Zimmerman, Allis-Chalmers Manufacturing Co. The choice of voltages is limited by the maximum width of the slot. An unfavorable choice may result in added length and weight of the unit and decreased efficiency. Zimmerman also said there is little advantage in having a common generator voltage for large installations built on a unit system.

Replying to a question, Zimmerman said that preferred standard machines can be bought, but most engineers have their own ideas on design of units larger than 100 Mw. There is not much price gain from buying a preferred standard; however, delivery may be better.

Outage Cards Speed Work

Recording causes, costs, etc, of service outages by the use of business machines is saving Long Island Lighting Co considerable money over the former manual method, said F. T. Hausle. Moreover, within an hour a more accurate history of interruptions on the distribution system can be obtained. Use of the machines for analyzing distribution outages was started two years ago and has just been started for transmission outages.

With the wide use of the unit scheme of generator, transformer, and breaker in series there is little market for circuit breakers with ratings larger than 6,000 amp. For this reason and because of high development costs, A. E. Kilgour, Allis-Chalmers Manufacturing Co, predicted that larger breakers would probably not be used in the future.

Optimum system design should allow adequate margins between operating conditions and thermal and stability limitations, said R. W. Ferguson, Westinghouse Electric Corp. Presently, systems closely approach this objective. In the future, care should be taken to maintain safe margins.

SYSTEM OPERATION COMMITTEE

Power companies should take the initiative in discussing their communication problems with the communication common carrier companies. J. G. McKinley, West Penn Power Co, offered this advice to the Pennsylvania Electric Association System Operation Committee at its winter meeting held at New York, Feb. 16 and 17. He also said that the following subjects should be closely watched because they will have a definite effect on the utility industry:

1. Removal of microwave authorization permits from the temporary category.

2. Bills which are before Congress to change operation of the Federal Communications Commission.

3. Operation of utility communication facilities during national emergencies.

4. Bell Telephone System's proposal of lower rates for volume traffic.

Phone Pairs Control Switches

The program also contained a description of a field trial of supervisory control equipment developed by Bell Telephone Co of Pa. and installed on the Philadelphia Electric Co system. In describing the equipment, G. R. Driesbach, Bell Telephone Co of Pa., said that the centralized control of pole type disconnecting switches and circuit breakers on Philadelphia Electric's distribution plant could contribute materially to expediting the electric service maintenance, to rapid restoral in event of power outage, and to safety of employees and the public.

System has been designed on a "fail safe" basis. Each controlled device has a unit code. An order to change position consists of a duplicate transmission of the unit code. Unless the two transmissions are identical, operation will not take place.

mounts quickly, easily
in existing 25-kvar brackets

This new Westinghouse power capacitor for high-voltage outdoor applications has the same mounting dimensions as the 25-kvar unit. Only height has been increased. This means more kvar capacity on limited pole space, twice the capacitor rating in the same rack. Here, certainly, are worth-while savings in installation or replacement cost per kvar—in time, space and labor. In stacking, too, over-all rack space can be cut 50%.

Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-60886

YOU CAN BE SURE...IF IT'S

Westinghouse

Westinghouse

Helping the industry meet its growing loads

6 million kva of high-voltage transformers boost utility economy

At year's end, 53 extra-high-voltage power transformers in the 330-kv range had been bought by the utilities, from Westinghouse, to set an industry record of leadership for the third straight year. Of these, nearly 2,000,000 kva were produced last year, 2,750,000 kva were built in 1954 and more than 1,000,000 kva were made available in 1953. Most recently, two 400,000-kva autotransformers, largest in the world, capped this performance.

The challenge for this record—America's ever-increasing demand for electric power—is one that Westinghouse is proud to meet.

Westinghouse performance means, too, advanced design improvements *now* for bigger loads, higher voltages, increased system flexibilities *as they are needed*. Performance-proved innovations such as Form-Fit® design and Shell-Form construction; improved, forced-oil cooling; higher levels of insulation performance; and outstanding service from condenser bushings are Westinghouse "look-ahead" features . . . engineered to make conversion and transmission of large power blocks more efficient, reliable and economical.

Impulse testing of *all* these units on the production line is an added guarantee of trouble-free performance from the first split second on-line.

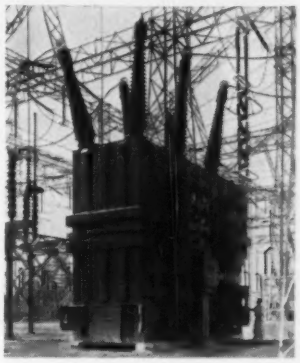
Higher goals are welcome at Westinghouse as milestones—on the way to equipping America's Utilities Today, for Tomorrow!

America's electrical needs are symbolized by this 400,000-kva autotransformer now in operation at the Tanners Creek plant of the Indiana & Michigan Electric Co. It is the greatest concentration of power conversion equipment in one unit ever applied to any system. J-97193

YOU CAN BE SURE...IF IT'S

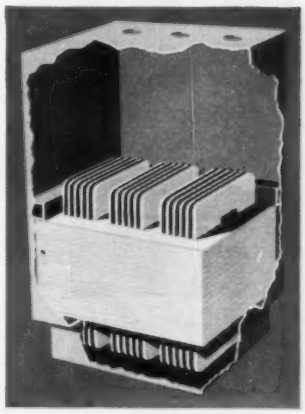
Westinghouse

At 400,000 kva . . . new, higher transformer capacity



The unique Westinghouse Shell-Form design means that coils are placed inside the core iron—natural, vertical cooling arrangement improves thermal characteristics; voltage oscillations are reduced for better dielectric qualities. This and other exclusive design features of Westinghouse extra-high-voltage transformers permit the same operating reliability and even greater system economies and flexibility as with equipment of much lower capacity.

Form-Fit design saves space, weight



Heart of the Westinghouse high-capacity, low-weight design is the Form-Fit construction. Snug-tailored, rugged, it reduces the volume and maintenance of coolant oil, permits upright shipment. It's a fact: Westinghouse Form-Fit transformers—in all sizes—are smaller and lighter per kva than any other design.

A wealth of experience in transformer design and production is available to you now through your nearby Westinghouse sales engineer; or write to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

LaPierre, Pritchard Get GE Executive Posts

C. W. LaPIERRE

General Electric Co has announced the appointments of Cramer W. LaPierre as an executive vice president and Charles R. Pritchard as a vice president.

LaPierre will continue to have over-all responsibility for the Electronic, Atomic, and Defense Systems Group and, as an executive officer, will assume jurisdiction over Electronics, Aircraft Gas Turbine, and Atomic Products Divisions.

Pritchard was president and general manager of the GE Supply Co, wholly owned distributing unit recently merged into the parent company as a division. He continues as division general manager.

C. R. PRITCHARD

LaPierre is a 1937 recipient of the Charles A. Coffin award, GE's highest honor. He joined the company in 1924 as member of the General Engineering Laboratory staff and later became head of the laboratory's electrochemical division.

Appointments as assistant general manager and general manager, Aircraft Gas Turbine Division, preceded his 1952 election as a vice president. In 1954 he was named a group vice president in charge of the Atomic Energy and Defense Products group which was re-formed into Electronic, Atomic, and Defense Systems Group in 1955.

Shortly after joining GE in 1918, Pritchard was named merchandise manager of Matthews Electric Supply Co, GE distributors in Birmingham. GE Supply in Atlanta named him promotion manager in 1932 and appliance sales manager in 1934.

Pritchard's 1940 appointment as GE Supply vice president was followed in 1944 by promotion to general sales manager of the appliance and merchandise department. Three years later he became marketing manager of that department. He was elected president and a director of GE Supply in 1950.

W. E. KELLEY

Walter Kidde Labs Appoints Kelley President

Wilbur E. Kelley, vice president in charge of engineering for Catalytic Construction Co since 1953, has joined Walter Kidde Nuclear Laboratories, Inc, as president. He succeeds retiring president Henry K. Norton who will continue as a member of the firm's board of directors.

During the six years following World War II, Kelley was manager of the New York Operations Office of the U. S. Atomic Energy Commission, with responsibility for processing uranium and other ores, procurement of special materials and devices, and administration of contracts for research, development, and procurement.

B.C. Firm Ups McMordie

New chief engineer of British Columbia Power Commission is Robert E. McMordie, formerly senior project engineer, Ontario Hydro Electric Power Commission. In the latter post he directed all project engineering for hydraulic generation and storage dams, including St. Lawrence Seaway project in which Ontario Hydro has a $300-million share.

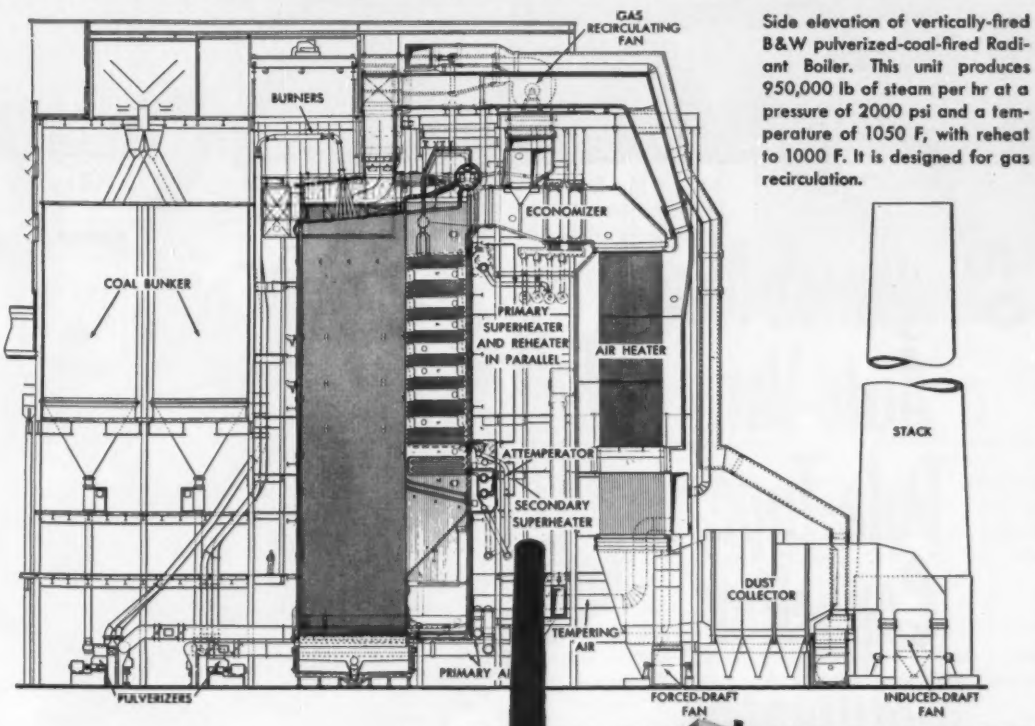
R. E. McMORDIE

Woodward Named Secretary

Geoffrey G. Woodward has been designated as secretary of the British Columbia Power Corp and its chief subsidiary, British Columbia Electric Co, Ltd., both in Vancouver.

He has served as assistant secretary since joining the Canadian company in 1947. Woodward is a graduate of the University of British Columbia.

G. G. WOODWARD



Side elevation of vertically-fired B&W pulverized-coal-fired Radiant Boiler. This unit produces 950,000 lb of steam per hr at a pressure of 2000 psi and a temperature of 1050 F, with reheat to 1000 F. It is designed for gas recirculation.

Modern Central Stations Serving America

Toledo Edison's BAY SHORE STATION

Equipped with a B&W Radiant Boiler

View of Bay Shore Station, latest addition in Toledo Edison Company's expansion program, George W. Saathoff, Consulting Engineer.

Bay Shore Station—a significant addition to Toledo Edison's generating capacity—is concrete evidence of that company's policy of combining a dynamic expansion program with the latest engineering advances.

This new 135,000-KW unit, which gives Toledo Edison a total installed capacity of over ½-million kilowatts, is the latest in a $90,000,000 program carried out over the past several years. Full use has been made of latest engineering developments, including high steam pressure and temperature, reheat, and gas recirculation.

B&W Boilers such as that installed in Bay Shore Station are the product of almost a century of boiler making experience, combined with the practical advances gained through B&W's continuing program of research and development—a combination that is making basic contributions toward increasingly efficient steam-electric power generation. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, New York.

G-757

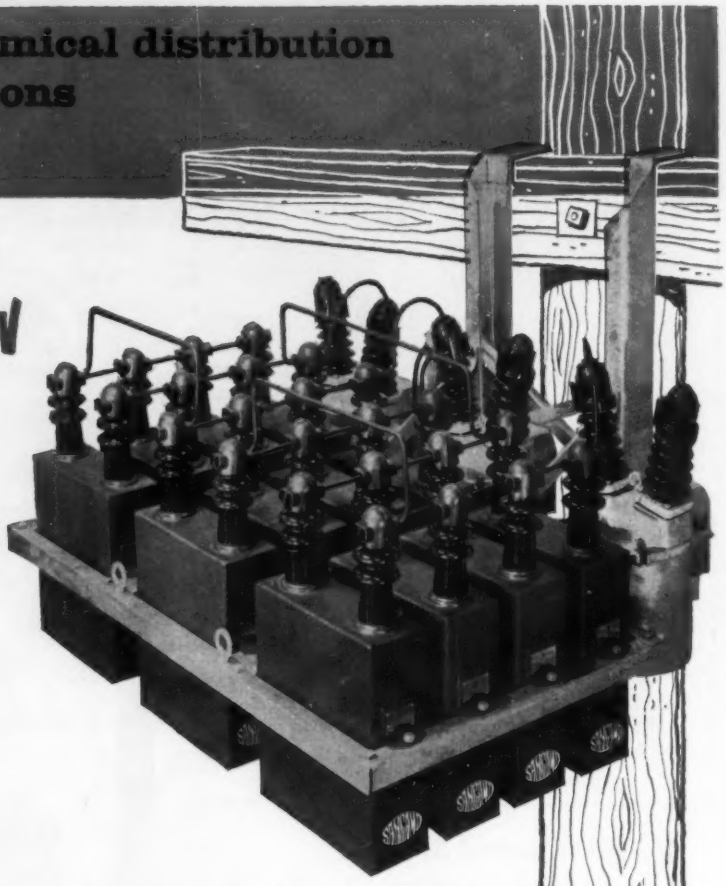
BABCOCK & WILCOX

BOILER DIVISION

for quick, economical distribution circuit installations

choose

Sangamo's New Auto-Var Pole-Type Capacitor Equipment



Now Sangamo's Diaclor Power Capacitors are available in factory-assembled and wired Auto Var equipment for pole-type installation. They are designed for easy installation, structural soundness, and excellent electrical performance in the improvement of power factor.

They offer all these features:

- Sangamo 25 Kvar Diaclor Power Capacitors.
- Hot dip galvanized steel rock for cross-arm mounting.
- Available with or without electrically-operated oil switches.
- Weatherproof junction box with terminal block for control wiring.
- Insulating caps on all capacitor and oil switch terminals.
- Clamp-type ground stud that accommodates #8 to #2/0 wire.
- Neoprene jacketed, #6 solid conductor connections between units.

Write for full information.

SANGAMO

SANGAMO ELECTRIC CO.

SPRINGFIELD, ILLINOIS

Skowbo Promoted to Senior VP

Stuart W. Skowbo, vice president and treasurer of Brown Co, has been elected senior vice president and treasurer. He will be senior officer of the company with his headquarters in the Berlin, N. H., area.

Skowbo joined Brown in 1954 as treasurer and was elected vice president and treasurer last July. Before that he was associated with General Electric Co for 15 years, working in its financial and cost divisions at Schenectady, N. Y., and Lynn, Mass. Other previous posts held by Skowbo include vice president and controller and later executive vice president of Coolerator Co, and controller and chief financial officer of Marshall-Wells Co.

S. W. SKOWBO

PERSONAL BRIEFS

After 42 years of electric industry service, **F. E. Andrews** retired March 1 as Commonwealth Edison Co's research engineer. He directed activities for Edison Research Committee, successor to Utilities Research Commission, and has authored numerous transmission and distribution engineering papers.

Gordon A. Atwater, management consultant since 1932, has joined Ebasco Services, Inc, as senior consultant in the space planning department.

Elected to membership in the Controllers Institute of America recently were **Arnold L. Adams,** comptroller, Monongahela Power Co; **William B. Walker, Jr,** assistant controller, Columbus & Southern Ohio Electric Co; and **Theodore W. Fryou,** treasurer and controller, Portland General Electric Co . . . Kentucky's **Gov Albert B. Chandler** has appointed **Simeon S. Willis** to the Public Service Commission to succeed **Cass R. Walden.**

Ralph L. Fusco has been named a member of New Jersey's Board of Public Utility Commissioners by **Gov Robert B. Meyner** for the term ending June, 1959. The former acting prosecutor of Passaic County succeeds **Mrs. Hortense F. Kessler,** who has resigned. **Edward J. Hart** was appointed president of the board.

Marketing section promotions in General Electric Co's power transformer department, Pittsfield, include appointment of five managers: **J. Benning Monk,** power transformer sales; **Robert Bry,** regulator and transformer product sales; **Edward V. Dillon,** customer relations; **Harold D. Beck, Jr,** marketing administration and personnel development; and **David R. Dalzell,** advertising and sales promotion . . . Four new section managers in GE's newly formed gear motor and transmission components department are **Ralph E. Coutant,** engineering; **Robert L. Spitler,** manufacturing; **Robert E. Kelley,** finance; and **Howard W. Bennett,** marketing.

West Coast appointments for Robertshaw-Fulton Controls Co upped Vice Pres **Wilbur Jackson,** former works manager of Grayson Controls Division in Long Beach, Calif., to division general manager. **Robert L. Wehrli** became general manager of Aeronautical Division Anaheim, Calif., after two years as Aeronautical research and development director.

William C. Foster, executive vice president, Olin Mathieson Chemical Corp, has been elected a director of Detroit Edison Co.

Bankers Trust Co, New York, N. Y., has announced the election of **Malcolm R. Tait** as vice president of their public utility group. His post of assistant vice president has been filled by **Lawrence C. Cooper.**

Elliott Co's vice president in charge of headquarters application engineering, **John W. Anne,** now heads up the firm's Jeannette (Pa.) Division manufacturing operations, including the Crocker-Wheeler industrial motor division, in addition to his present duties.

Walter T. Saveland, Jr, has been appointed head of the service and renewal parts group of Allis-Chalmers Manufacturing Co's motor and generator department.

Irvington Varnish & Insulator Division of Minnesota Mining & Manufacturing Co has appointed **Gordon Brown** general manager of its Coating Division. He replaces **W. J. Stillwell** who has transferred to MM&M's St. Paul Electrical Products Division. Succeeding Gordon Brown as Irvington Plastics Division general manager is **Erwin Brown,** former divisional engineer at St. Paul.

James G. Waitneight has been named assistant vice president, executive operations, of Bell Telephone Co of Pennsylvania.

OBITUARIES

Edward D. Anderson, 54, executive vice president of Northern Indiana Public Service Co, Hammond, Ind., died recently after a year's illness.

H. L. Nickerson, 65, board of directors member and retired Southwestern Gas & Electric Co treasurer, died at his Shreveport, La., home Feb. 21.

Floyd W. Woodcock, 67, retired utilities executive of companies serving eight states, died recently after a long illness in his Wilmington, Del., home. Among his utility affiliations were the Cresent Public Service Co, Central Louisiana Electric Co, Colorado Central Power Co, East Coast Electric Co, Ohio Light & Power Co, and East Coast Public Service Co.

MEETINGS CALENDAR

MARCH

AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS—Fifth Annual Spring Conference, Hotel Cleveland, Cleveland, Ohio, March 15-16.

EDISON ELECTRIC INSTITUTE—Industrial Relations Committee, Muehlebach Hotel, Kansas City, Mo., March 15-16; Street Lighting Committee, Minneapolis, March 23-24; 22nd Annual Sales Conference, Edgewater Beach Hotel, Chicago, March 26-29.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Spring Meeting, Multnomah Hotel, Portland, Ore., March 18-21.

ATOMIC INDUSTRIAL FORUM, INC—Hotel Plaza, New York City, March 19-20.

INSTITUTE OF RADIO ENGINEERS—Annual National Convention, Waldorf-Astoria Hotel, New York, March 19-22.

AMERICAN POWER CONFERENCE—18th Annual Meeting, Sherman Hotel, Chicago, Ill., March 21-23.

OKLAHOMA UTILITIES ASSOCIATION—Annual Convention, Biltmore Hotel, Oklahoma City, Okla., March 22-23.

PACIFIC COAST ELECTRICAL ASSOCIATION—Engineering & Operating Section, Palace Sheraton Hotel, San Francisco, March 22-23.

TENNESSEE VALLEY PUBLIC POWER ASSOCIATION—10th Annual Meeting, Farragut Hotel, Knoxville, Tenn., March 30-31.

APRIL

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—South West District Meeting, Baker Hotel, Dallas, Tex., April 2-4; Special Technical Conference & Exhibit on Magnetic Amplifiers, Hotel Syracuse, Syracuse, N. Y., April 5-6; 8th Conference on Electrical Engineering in the Rubber and Plastics Industries, Mayflower Hotel, Akron, Ohio, April 9-10; Great Lakes District, Fort Wayne, Ind., April 16-18; Technical Conference, Bradford Hotel, Boston, Mass., April 26-27.

INDIANA ELECTRIC ASSOCIATION—16th Annual Young Men's Utility Conference, Hotel Van Orman, Fort Wayne, Ind., April 4-5.

ELECTRICAL MAINTENANCE ENGINEERS ASSOCIATION—8th National Biennial Electric Industry Show, Shrine Exposition Hall, Los Angeles, Calif., April 5-7.

MARYLAND UTILITIES ASSOCIATION—Annual Business Conference, Lord Baltimore Hotel, Baltimore, Md., April 6.

MIDWEST RESEARCH INSTITUTE—Symposium for Management on Applications of Analog Computers, Hotel Phillips, Kansas City, Mo., April 10-11.

POINT OF PURCHASE ADVERTISING INSTITUTE—10th Annual Symposium & Exhibit, Hotel Sheraton Astor, N. Y., April 10-12.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Engineering & Operation Section, Hotel Vancouver, Vancouver, B. C., April 11-13.

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Annual Membership Meeting, Ridpath Hotel, Spokane, Wash., April 11-13.

SOUTHEASTERN ELECTRIC EXCHANGE—Engineering & Operation Section, Bon Air Hotel, Augusta, Ga., April 12-13.

EDISON ELECTRIC INSTITUTE—National Conference of Electric & Gas Utility Accountants, sponsored jointly with AGA, Hotel Commodore, New York, April 16-18; Industrial Relations Committee, EEI Headquarters, New York City, April 19; Engineering Committees, Edgewater Beach Hotel, Chicago, Ill., April 30-May 2.

GREATER NEW YORK SAFETY COUNCIL—26th Annual Safety Convention & Exposition, Hotel Statler, New York City, April 16-20.

ATOMIC INDUSTRIAL FORUM, INC—Atomic Energy Conference, Atlanta, Ga., & Oak Ridge, Tenn., April 17-19.

MISSOURI VALLEY ELECTRIC ASSOCIATION—Engineering Conference, Hotel President, Kansas City, Mo., April 18-20.

PACIFIC COAST ELECTRICAL ASSOCIATION—Administrative Services Section Meeting, Huntington-Sheraton Hotel, Pasadena, Calif., April 18-20.

***PENNSYLVANIA ELECTRIC ASSOCIATION**—Meter Committee, Roosevelt Hotel, Pittsburgh, Pa., April 19-20.

PROTECTIVE RELAY ENGINEERS—Ninth Annual Conference, Department of Electrical Engineering, Agricultural and Mechanical College of Texas, College Station, April 23-25.

MAY

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—North Eastern District Meeting, Rochester, New York, May 2-4.

EDISON ELECTRIC INSTITUTE—Accident Prevention Committee, Coronado Hotel, St. Louis, Mo., May 2-4; Purchasing & Stores Committee, Sheraton Plaza Hotel, Boston, Mass., May 7-9; Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, Ill., May 8; Transportation Committee Meeting, jointly with AGA, Congress Hotel, Chicago, Ill., May 8-11; Industrial Relations Committee, Willis E. Hughes Memorial, Rochester, N. Y., May 17.

NATIONAL FARM ELECTRIFICATION CONFERENCE—LaSalle Hotel, Chicago, Ill., May 3-4.

AIR-CONDITIONING & REFRIGERATION INSTITUTE—Annual Meeting, The Homestead, Hot Springs, Va., May 7-9.

AMERICAN WELDING SOCIETY—Fourth Welding Show, Memorial Auditorium, Buffalo, N. Y., May 9-11.

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Engineering & Operations Section, Cascadian Hotel, Wenatchee, Washington, May 10-11.

PACIFIC COAST ELECTRICAL ASSOCIATION—Annual Convention, Las Vegas, Nevada, May 14-16.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Design Engineers—Design Engineering Conference, Convention Hall, Philadelphia, Pa., May 14-17.

***ILLINOIS INSTITUTE OF TECHNOLOGY**—Industrial Nuclear Technology Conference, Museum of Science & Industry, Chicago, Ill., May 15-16.

PENNSYLVANIA ELECTRIC ASSOCIATION—Relay and Electrical Equipment Committees, Hotel Roosevelt, Pittsburgh, May 17-18.

***NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS**—30th Engineering Industries Exposition with Annual Convention, Statler Hotel, New York City, May 17-19.

INDUSTRIAL HEATING EQUIPMENT ASSOCIATION, INC—Spring Meeting, The Homestead, Hot Springs, Va., May 20-23.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Business Development Section, Benjamin Franklin Hotel, Seattle, Wash., May 21-23.

AMERICAN MANAGEMENT ASSOCIATION—General Management Conference, Hotel Roosevelt, New York City, May 23-25.

CIGRE—16th Annual International Conference, Paris, France, May 30-June 9.

JUNE

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS—52nd Annual Meeting, Sheraton-Gibson Hotel, Cincinnati, Ohio, June 4-6.

EDISON ELECTRIC INSTITUTE—24th Annual Convention, Traymore Hotel, Atlantic City, N. J., June 4-6.

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—48th Annual Convention, Ambassador & Chelsea Hotels, Atlantic City, N. J., June 11-14.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Semi-annual meeting, Statler Hotel, Cleveland, Ohio, June 17-21.

AMERICAN SOCIETY OF TESTING MATERIALS—59th Annual Meeting & 12th Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J., June 17-22.

FIFTH WORLD POWER CONFERENCE—Vienna, Austria, June 17-23.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Accounting & Business Practice Section, Multnomah Hotel, Portland, Oregon, June 21-23.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer and Pacific General Meetings, San Francisco, California, June 25-29.

* Additions this week.

In Taconite processing plant, ANACONDA Interlocked-armor cable is used for feeder line . . . resists weather and industrial hazards.

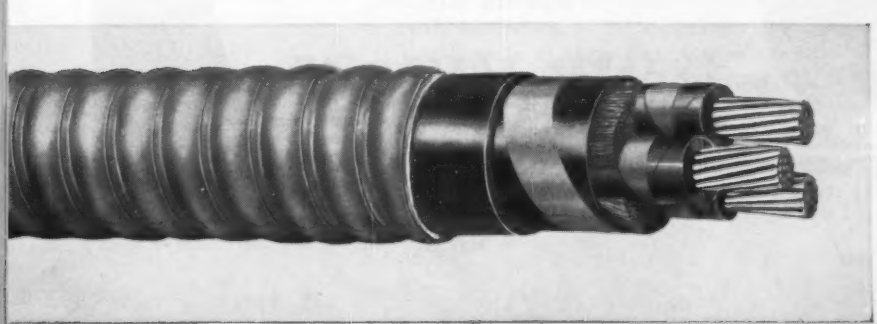
New cable puts power where you want it—fast!

With ANACONDA Interlocked-armor cable you bring power to new load centers faster—change plant layout quickly, or add new facilities in a hurry!

It is economical—installed fast—indoors or out—with simple supporting devices . . . trained easily around corners, columns and other obstructions in long unbroken runs. Circuits are easy to relocate . . . always accessible. And this cable's interlocked metal-tape armor affords high mechanical protection against all types of damage.

The Man from Anaconda, or your nearest Anaconda distributor, will be happy to give you full information. Or write to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. 8C318

ASK THE MAN FROM ANACONDA®
FOR INTERLOCKED-ARMOR CABLE



Anaconda Interlocked-armor cable comes in sizes No. 6 Awg to 750 Mcm—copper or aluminum—up to 15 kv—Underwriters' approval for 600 volts and 5000 volts. Available with rubber-, plastic- or varnished-cambric-type insulation.

YOU GET

LONG-LASTING PROTECTION FOR YOUR OVERHEAD SYSTEM

with

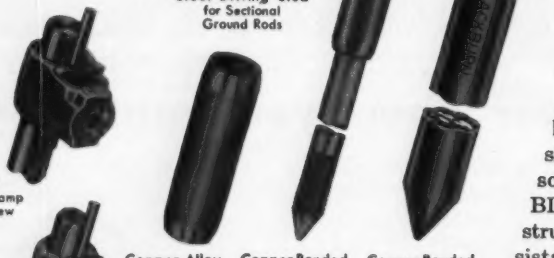
BLACKBURN *Grounding* DEVICES

Type GTC 1
One plate tower ground clamp

Type GTC 2
Two plate tower ground clamp

Copper Bonded Pigtail

Type GUV
U-bolt ground clamp parallel or 90°



Steel Driving Stud for Sectional Ground Rods

Type GG
Ground Rod Clamp
Socket set screw

Copper Alloy Coupling for Sectional Ground Rods

Copper Bonded Sectional Ground Rods

Copper Bonded Regular Ground Rods

Type GGH
Ground Rod Clamp
Square head bolt

Type B
Budget Line Ground Rod Clamp
Square head bolt

Type GP 100
Electrolytic Copper Pole Bottom Plates
7½", 10", 14" dia.

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Engineering Teaching Spurred

Consumers Power establishes group of engineering scholarships, including help for those who want to teach engineering

In a unique move to help meet the nation's need for engineers, Consumers Power Co has announced a program of support in the area of teaching, as well as the development of engineering students.

The company has established a group of scholarship and fellowship programs in 18 Michigan colleges and universities. Financial assistance will be provided annually for 39 students within the first three-year build-up of the plan.

"The program has two objectives," said Justin R. Whiting, chairman of the board of Consumers. "These are to encourage the study and teaching of engineering, and to help deserving students continue their education.

"In this atomic age if the United States is to maintain its international leadership, it must induce a greater number of the coming generation to study science.

"One way to encourage the study of engineering," Whiting added, "is by helping to provide qualified teachers. It is becoming difficult to attract engineering graduates into the teaching profession. Jobs at attractive salaries are readily available to engineering graduates, and not enough are willing to turn down good jobs and continue their studies for three additional years in order to become competent teachers."

Financial assistance of up to $2,000 per year for three years will be given to two graduate students each year who are preparing themselves to teach engineering and who pursue studies leading to doctorate degrees. These fellowships will be at the University of Michigan and Michigan State University.

In each of five educational institutions, a sophomore engineering student, preferably in electrical or mechanical engineering, will be granted a scholarship of $650 per year for the remaining three years of his undergraduate period. These schools are, in addition to the two named above, the Michigan College of Mining and Technology, University of Detroit, and Wayne University.

At each of 18 Michigan institutions including the above, one freshman student each year will receive a $200 scholarship for any course of study selected. Applicants are to be from the company's 64 Michigan county service area.

"It is estimated that 50,000 new engineers per year are needed in the United States," Whiting said, "but in 1955 only 19,000 engineers were graduated.

"We are hopeful that the graduate fellowship and the other scholarships provided through the Consumers program will help in some degree to meet the shortage of engineering graduates that now exists," said the utility executive.

Tacoma Uses Parachute Harness

A parachute harness is used by crews of the Tacoma, Wash., Department of Public Utilities in a new procedure developed to rescue a stricken man from one of the downtown underground vaults, in case of accident.

In most cases the first step in aiding the "victim" is to restore normal breathing by the application of artificial respiration before any attempt is made to move him. The moving job, in which the man must be in an upright position to pass through the manhole opening, must be a fast one. The patient is fitted with a parachute harness which then is hooked to a rope suspended from a block and tackle attached to a ladder "A" frame. Employees (above) place their fellow workman from the vault on a stretcher ready for transfer to the hospital in about 30 seconds.

This Seal

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Means - New Economies for Bus Regulation

25 REGULATING COMBINATIONS
This regulator equipped with
Vari-Amp Feature
ALLIS-CHALMERS

Here's how *Vari-Amp* feature lets you meet changing conditions

It's simple to match station regulator capacity to increasing loads with Allis-Chalmers exclusive *Vari-Amp* feature. Whenever greater current capacity is needed, it can be obtained by reducing the range of regulation. Then, the taps on the transformer supplying the regulator can be changed to obtain desired voltages.

Allis-Chalmers power regulators now have five current ratings in a single unit — 25 regulating combinations when you figure unequal ranges. A regulator is no longer the bottleneck to increasing substation capacity — now it can grow with your system.

The example shown in the box below is only one of the many possibilities for improved regulation with the *Vari-Amp* feature. You get it on Allis-Chalmers voltage regulators. Get the full story. Call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. A-4898

Here's One Example:

	Without *Vari-Amp*	With *Vari-Amp*
Transformer Voltage	100%	105%
Regulator Range	± 10%	5% to 10%
Bus Voltage	90% to 110%	95% to 110%
Rated Bus Current	100%	126%

ALLIS-CHALMERS
Originators of 5/8% Step Voltage Regulators

CHALMERS AC ALLIS-CHALMERS

MEETING REPORT

More Industrial Heating Load Sought

- **Industrial Electric Heating Conference spurs sales activity**
- **O'Brien urges utilities, manufacturers to "close ranks and sell"**
- **Meeting features the many applications with growth potential**

Without slogans or fanfare, a coordinated assault is being launched by electric utilities and manufacturers on the virtually unlimited load potential of the industrial electric heating field.

This was evidenced at the second National Industrial Electric Heating Conference held Feb. 6-10 at Cincinnati and sponsored by the Industrial Electrification Council. More than 60 speakers explained nearly every industrial application of electric heat to the 142 representatives of utilities and 69 of manufacturers.

Many Cases and Applications

Some speakers delivered technical discussions intended only to acquaint the conferees with the principles of such processes as aluminizing, vacuum melting, or annealing and hardening. Others dealt with specific cases and equipment applications, such as radiant heating with metal sheath electric heaters and quartz tubes or induction melting and surface hardening with electric furnaces. The talks of the final day were down-to-earth discussions of markets and selling.

But probably of most importance to the conferees was the careful advice they received on planning and coordinating their sales efforts.

O'Brien Urges Coordination

W. V. O'Brien, vice president and general manager of General Electric Co's Apparatus Sales Division, urged the group to "close ranks and sell." He advocated "a central organization for planning and a local organization for doing."

The Industrial Electrification Council, he said, can set up national goals and objectives. The electric utility is "an excellent local focal point to get the common goals of the industry carried to the customers."

Manufacturers can contribute scientific research, manufacturing skill, and greatly intensified marketing effort, the GE official observed. "Electric utilities can, through planned, consistent, and creative sales effort at the local level, bring to your customers the advantages of electric industrial heating for greater production," he said.

Some highlights of the electric heating conference follow:

• The importance of the small heater market was emphasized by J. H. Ahrens, industrial sales manager, Hartford Electric Light Co. He advocated the metal sheath electric heater as an economical solution to many heating problems.

These heaters can acquaint the customer with the advantages of electric heat "in a most convincing manner" and thereby open the door for larger installations of electric heat, he pointed out.

Ahrens estimated that there are 16-million kw of these heaters on utility systems today representing an annual revenue of about $330 million. This is 60% of the total load of all types of electric heating equipment, he said.

J. REED HARTMAN welcomes delegates to second National Industrial Electric Heating Conference. He is vice president of Cincinnati Gas & Electric Co and chairman of executive committee of Industrial Electrification Council.

• Power salesmen were cautioned not to overlook the role of the heat pump in industry. Paul O'Neill, General Electric's Weathertron Division, presented a case for the heat pump as "the best heating and cooling system for industrial buildings."

Heat Pump Does 2 Jobs

He warned: "None of us can or should pass up the opportunity to analyze every new industrial building for the application of the heat pump. The same applies to any industrial plant planning to install only summer cooling. You may find that its heating system is due for replacement and that it is a heat prospect."

A major selling feature of the heat pump, he said, is the maintenance of constant temperature and an even level of relative humidity which is important in some manufacturing operations. Another selling point is zone control, O'Neill added. He explained that one unit can cool one portion of the plant while other units simultaneously heat a different plant area.

Ovens: Gas or Electricity

• Electric heating methods have and will continue to play a major part in the development of quality products treated in low-temperature industrial ovens. However, P. A. Meyer, vice president, Michigan Oven Co, warned that the fuel choice today is between direct gas and electricity.

He explained: "The most economical fuel for an oven is seldom selected on a direct cost per Btu basis. . . The real comparison is the value of the finished product, con-

(*Continued on page* 55)

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Manufactured with solid conductors or stranded in a variety of strandings, coated or uncoated, according to your needs. Available in single or multiple conductor.

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NET INCOMES OF 75 OPERATING

COMPANY	1955	1954	COMPANY	1955	1954
Alabama Power*	$14,026,971	$13,046,300	Consumers Power	29,035,909	26,551,696
Appalachian Electric Power*	14,890,385	12,992,078	Dallas Power & Light*	7,197,856	6,219,276
Arkansas Power & Light*	7,343,780-D	8,507,485	Delaware Power & Light	4,320,297	3,876,311
Atlantic City Electric	4,396,127	3,907,497	Detroit Edison	26,297,190	22,137,173
Baltimore Gas & Electric	14,075,000	12,141,000	Duquesne Light	17,879,908	15,880,695
Boston Edison	9,232,282	8,459,544	Empire District Electric	1,687,044	1,482,264
California Electric Power	3,108,243	2,469,270	El Paso Electric	2,170,696	2,158,256
California-Oregon Power	3,817,027	3,416,362	Florida Power & Light	13,755,272	10,678,718
Carolina Power & Light	9,368,985	7,846,241	Georgia Power*	14,160,274	13,049,057
Central Gas & Electric	1,992,873	1,690,778	Gulf States Utilities	10,639,980	9,483,988
Central Hudson Gas & Electric	3,485,177	3,220,607	Houston Lighting & Power	15,083,615	13,112,631
Central Illinois Light	4,202,307	3,535,701	Idaho Power	5,027,904	4,818,907
Central Illinois Public Service	8,988,467	7,378,733	Indiana & Michigan Electric*	10,034,171	8,976,561
Central Louisiana Electric	2,061,149	1,693,323	Iowa Electric Light & Power	3,774,114	3,235,232
Central Maine Power	6,798,141	5,950,453	Iowa-Illinois Gas & Electric	4,841,456	4,462,226
Central Vermont Public Service	1,364,219	1,362,344	Iowa Power & Light	4,220,840	3,921,227
Cincinnati Gas & Electric	14,032,854	12,791,356	Iowa Public Service	3,423,819	3,372,088
Cleveland Electric Illuminating	17,810,321	14,063,819	Iowa Southern Utilities	1,394,938	1,201,558
Community Public Service	1,475,606	1,385,891	Kansas Gas & Electric	4,756,802	4,696,442
Consolidated Edison of N. Y.	52,320,256	50,289,300	Kansas City Power & Light	8,158,606	7,129,897

First Electric Utilities Reporting '55

The first 75 investor-owned operating electric utilities to report for the 1955 year had an aggregate net income of $790,431,503, an increase of $82,689,701, or 11.2% over 1954. These 75 utilities contributed some 62% of the net income of the entire investor-owned industry and, accordingly, their achievement may be taken as representative of the entire private industry.

Actually, 72 of the utilities listed in the above table reported combined net income of $773,899,919 while three of them reported an aggregate decline of $1,327,043 in 1955 under 1954.

Companies with declining net income were:

Company	Amount
Arkansas Power & Light	$1,163,705
Southern Indiana Gas & Electric	23,056
Southwestern Public Service	140,282
	$1,327,043

The major reason for the increased earnings of the 75 companies as a group was the sharp rise in energy sales during the year, the Federal Power Commission having recently stated that kwhr sales of all electric utilities in the country—both publicly and privately owned—in 1955 were 15.8% above the 1954 mark. Rate increases put into effect during the year were a factor. Another reason was the continued decline in fuel consumption per kwhr, the average having dropped from 0.991 lb of coal or its equivalent in other fuels in 1954 to 0.950 lb in 1955.

Ten Top Companies Listed

The ten top operating private power companies in percentage increase in net income in 1955 over the preceding year were:

Company	Percent Increase
Potomac Electric Power	30.4
Florida Power & Light	28.7
Cleveland Electric Illuminating	26.7
California Electric Power	25.8
Central Louisiana Electric	21.1
Long Island Lighting	19.7
Carolina Power & Light	19.4
Detroit Edison	18.8
Montana Power	17.9
Central Illinois Light	16.0

As a group the 15 electric utilities serving the metropolitan areas of Baltimore, Boston, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., Toledo, and Washington, D. C., made a lower showing than did the companies with far-flung service areas, having reported an aggregate net income of almost $265 million, an increase of 12% over 1954, compared with wide-spread companies, and comprising more than 21% of the 75-company total. Of the 75 companies Pacific Gas & Electric Co topped the group with a net income of $71,035,000, while Sierra Pacific Power Co was at the tail end with $1,099,829.

Dividing the country rather arbitrarily into five sections, the 11 tabulated companies operating east of the

ELECTRIC UTILITIES (For Calendar Years 1955 and 1954)

COMPANY	1955	1954	COMPANY	1955	1954
Long Island Lighting	11,064,950	9,242,126	Puget Sound Power & Light	4,924,981	4,461,331
Louisville Gas & Electric	7,041,502	6,105,263	Rochester Gas & Electric	5,810,743	4,446,411
Minnesota Power & Light	4,112,951	3,551,138	Rockland Light & Power	1,661,903	1,491,300
Mississippi Power*	2,210,105	2,123,768	San Diego Gas & Electric	5,864,069	5,126,726
Mississippi Power & Light*	4,188,860	3,874,061	Sierra Pacific Power	1,099,829	973,304
Missouri Public Service	1,654,630	1,616,117	Southern California Edison	29,172,504	26,618,255
Montana Power	8,715,284	7,392,229	Southern Indiana Gas & Electric	2,445,037-D	2,468,093
New England Gas & Electric	3,364,433	3,224,619	Southwestern Public Service	6,742,767-D	6,883,049
N. Y. State Electric & Gas	10,631,041	9,382,952	Tampa Electric	3,410,990	2,977,025
Northern States Power	18,691,896	17,229,948	Texas Electric Service*	10,910,131	10,341,053
Oklahoma Gas & Electric	8,367,255	6,974,674	Texas Power & Light*	10,615,841	10,233,480
Ohio Edison	23,350,814	20,270,680	Toledo Edison	6,991,549	5,755,147
Ohio Power*	16,934,103	14,369,893	Tucson Gas, Electric Light & Power	1,858,353	1,807,410
Pacific Gas & Electric	71,035,000	63,039,000	Virginia Electric & Power	19,052,033	16,786,651
Pennsylvania Power & Light	22,137,527	21,040,199	Washington Water Power	4,933,617	4,442,915
Philadelphia Electric	33,219,035	30,889,079			
Portland General Electric	5,021,980	4,346,352			
Potomac Electric Power	8,457,000	6,483,358			
Public Service Electric & Gas	30,333,686	27,541,724			
Public Service of New Hampshire	1,754,243	1,640,187			

TOTAL—75 Companies $790,431,503 $707,741,802

* Indicates all common shares are owned by a holding company.
D- Indicates decrease from 1954.

Earnings Show 11.2% Rise over '54

Mississippi and south of Maryland-Pennsylvania-Ohio reported an aggregate of close to $110 million in net income for 1955, an increase of 15.2% over 1954 and representing 14.0% of the 75-company total. This section was topped only by the 19 companies operating between the Pennsylvania and Colorado borders and between the Missouri-Kansas line and the Canadian border. These companies reported a combined net income of about $202 million, an increase of 14.5% over 1954 and equal to 25.6% of the total for 75 companies.

Regional Tallies Vary

The 12 Mountain-Pacific companies reported a combined net income of around $144.6 million, an increase of 12.2% over 1954 and equivalent to almost 19% of the 75-company total, while the 18 electric utilities in the section north of the Virginias and Kentucky, but east of Ohio with New England included, showed an increase of a little more than $233 million, a boost of better than 9% over 1954 and comprising some 29.6% of the aggregate for 75 companies. Finally the 15 tabulated companies operating in the area west of the Mississippi and south of the Nebraska-Colorado border reported combined net incomes of almost $99 million, an increase of roughly 14.5% over 1954 and equivalent to almost 13% of the 75-company total.

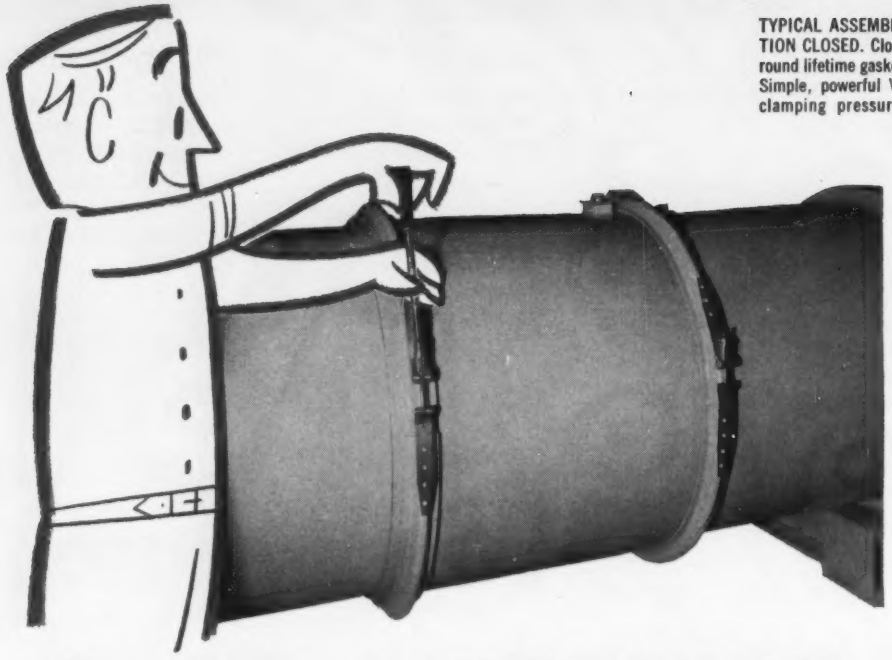
Some Declines Noted

The three declines in net income in 1955 from the 1954 level (Arkansas P&L, Southern Indiana G&E and Southwestern Public Service) are in the process of correction, since they are due to regulatory causes (rate increases), and a slackening down of the construction program which effects the "interest during construction" account in the statement of income.

It would appear that the 75 operating utilities as a group will continue to boost their earnings over the next three years. At the close of 1955, 48 of them with an aggregate installed generating capacity at name-plate rating of 37,409,878 kw had announced plans for additions during 1956-58 period of 11,163,750 kw, an increase in generating capacity of 29.8%. Furthermore, practically all of the 75 companies without expansion plans for the 1956-58 years expect to increase generating capacities after the close of the three-year period.

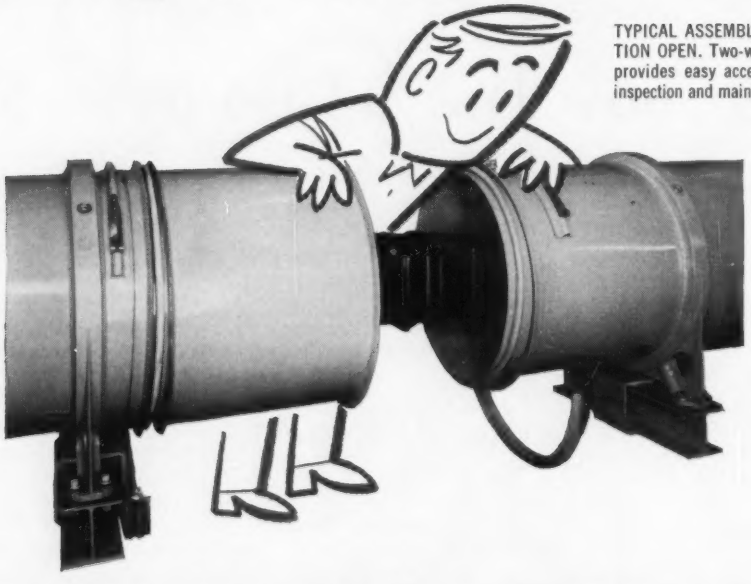
Breaking down the 75-company plans, as previously used, for expansion of capacity, 16 of the listed 18 companies operating in the Northeast with a 1955 capacity of 11,350,895 kw expect to add 3,157,000 kw, a boost of 27.8% by the end of 1958.

Similarly six companies in the Midwest with a present capacity of 4,392,000 kw plan to add 1,282,000 kw, a rise of 29.2%. During the same period 11 Southeastern utilities will add a total of 8,743,736 kw, or 29.6%; Southwestern companies will add 2,103,550 kw, or 44.4% to installed capacities, and eight companies in the Mountain-Pacific area with a presently installed 8,179,795 kw expect to add 2,034,000 kw in the 1956-58 period to boost capacity by 24.2%.



TYPICAL ASSEMBLY WITH TELESCOPING SECTION CLOSED. Closure requires only two 1-piece round lifetime gaskets—easy to place and remove. Simple, powerful V-clamp couplings distribute clamping pressure uniformly around the ring.

New design of I-T-E Isolated Phase Bus



TYPICAL ASSEMBLY WITH TELESCOPING SECTION OPEN. Two-way sliding telescoping section provides easy access to connectors—simplifies inspection and maintenance.

simplifies installation and inspection

All-welded aluminum basic assemblies—joined together with 2-way sliding telescoping sections—cut installation and inspection time. A V-clamp closure and a 1-piece round gasket in each telescoping section joint assure a permanently tight seal. This new design reduces gasketing 75%. In addition, it combines great strength and light weight with structural simplicity. And smooth inside surfaces prevent the accumulation of moisture.

Bulletins 10004-A and 10004-B describe I-T-E Isolated Phase Bus designs. For copies of these bulletins, write I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Phila. 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • **Switchgear Division**

AG&E to Spend $700-Million

. . . to add 2,600,000 kw in generating capacity in 5-year expansion program; project considered company's, industry's largest

American Gas & Electric Co has announced a $700-million, five-year expansion program which will add 2,600,000 kw of generating capacity to the seven-state system.

This represents the largest expansion not only in AG&E's 50-year history but is reportedly largest undertaken by private electric utility.

The addition of 2,600,000 kw to the system is more capacity than is presently available in any one of 33 of the 48 states.

Claims Capacity Exceeds TVA's

"This capacity," remarked Col. H. S. Bennion, managing director of Edison Electric Institute, "is greater than all the hydro capacity built and under construction by Tennessee Valley Authority from its creation in 1933 to the present day."

The expansion program will raise the AG&E System's total generating capability to 6,600,000 kw by 1960, or more than double the system's capacity in 1952 and more than triple its 1949 capacity.

First phase of the program, with a total of 1,700,000 kw already under construction or to be started within the next 45 days, will be completed between 1956 and 1958.

Units now under construction are: Philo unit 6, Philo, Ohio, 125,000 kw for Ohio Power Co; Glen Lyn unit 6, Glen Lyn, Va., 225,000 kw, Appalachian Electric Power Co; and Muskingum River unit 3, Beverly, Ohio, 225,000 kw, and unit 4, 225,000 kw, both for Ohio Power.

Plan Start of 4 Additional Units

Units which will be started within 45 days are: Kammer unit 1, Captina, W. Va., 225,000 kw, to be owned by Cresap Generating Co, a joint subsidiary of Olin Mathieson Chemical Corp and Pittsburgh Consolidation Coal Co, and operated by Ohio Power; Kammer unit 2, 225,000 kw, owned and operated by Ohio Power; and Clinch River units 1 and 2, Carbo, Va., each 225,000 kw, for Appalachian Electric Power.

The remaining 900,000 kw of generating capacity, for which details have not yet been announced, will be started by mid-1956 and completed during 1959-60.

Philip Sporn, president of AG&E, stated, "Our new program—larger than anything we have ever undertaken before—underlines in terms of concrete action our confidence in the potential growth of the region . . ."

In addition to expansion of generating facilities, a large portion of the $700 million will be used for construction of transmission lines, distribution lines, substations, and operating and service centers. AG&E also plans erection of new links in its system's 330,000-v network, the highest voltage transmission system in the country.

Reasons for inaugurating the program, listed by Sporn, are:

1. Recent growth in system load, which increased 12% in 1955 alone.

2. Expansion of existing industry and increase of new industry into AG&E territory, including heavy power-consuming industries such as aluminum, ferro-alloys, chlorine, ammonia, and other chemicals.

3. Continued progress in finding new uses for electric energy in all categories.

4. Increase in population expected in AG&E territory as well as throughout the country.

Sporn said that studies made by AG&E indicated that, "as a result of natural growth and of our continuing efforts in area development, the utilization of electric power on our system will increase four-fold over the next 20 years. This building program, therefore, is but a first step in quadrupling our facilities to meet that demand in that time."

AG&E System members and the states they serve are Appalachian Electric Power Co, Virginia and West Virginia; Indiana & Michigan Electric Co, Indiana and Michigan; Kentucky Power Co, Kentucky; Kingsport Utilities, Inc, Tennessee; Ohio Power Co, Ohio; and Wheeling Electric Co, West Virginia.

Power Meet to Draw Top Men

Emphasis on power generation, including hydro, nuclear, and steam plants and their related operations, will highlight 18th annual American Power Conference from March 21-23 at Chicago's Sherman Hotel.

Top engineers will present papers during the three-day meeting sponsored by Illinois Institute of Technology. Nine Midwestern universities and nine engineering societies will cooperate on the conference, aided by five regionally associated schools.

J. Harris Ward, executive vice president, Commonwealth Edison Co, Chicago, will be chairman of the opening meeting. Speakers for the first sessions will include Allis-Chalmers Manufacturing Co Pres R. S. Stevenson, and Harllee Branch, Jr, president of Edison Electric Institute and Georgia Power Co.

A Nuclear Energy Forum slated for the evening of the 21st will be headed by Chairman Raymond D. Maxson, senior vice president of Commonwealth and Co-chairman Louis C. McCabe, president of Resources Research, Inc, Washington, D. C.

The role of government in nuclear power development will be given by W. Kenneth Davis, director of Atomic Energy Commission's Reactor Development Division. E. K. McCune, General Electric Co vice president and general manager, will present industry's role in the same field. Charles J. Haugh, second vice president of Travelers Insurance Co and a member of AEC's Insurance Study Group, will discuss problems of insuring nuclear power plants.

A total of 65 papers will be presented in addition to keynote talks. Emphasis will be on broad, over-all aspects of subjects, conference leaders say, rather than technical details.

Registrations will begin at 9 a.m. March 21 at the Sherman Hotel. Fee of $8 includes a volume containing all papers and talks. Advance registrations are being handled by Edwin R. Whitehead, secretary; American Power Conference; Illinois Institute of Technology; Technology Center; Chicago 16, Illinois.

1956 Foreseen as Turning Point in AW Movement

NAW conferees believe special campaigns by industry will sell public on importance of wiring

GEORGE E. WHITWELL, vice president of sales, Philadelphia Electric, gets Community Service Award for Utility Companies from Look Magazine's Vice Pres Frederick Bauer

This year, 1956, will mark the turning point in the Adequate Wiring movement. This was the thought that appeared to permeate the 400 delegates at the 12th annual National Adequate Wiring Conference, Feb. 23-24, at Chicago.

The thought was prompted by the conviction that the added drive of the EEI Housepower campaign, the industry's Live Better—Electrically program, and the united efforts of the industry in other programs would at last turn the tide and that the public would realize that modern wiring is essential to modern electrical living.

Some campaigns are already beginning to show results. This was apparent from some of the reports to the conference. During 1955, Philadelphia Electric Co's 100-A wiring promotion resulted in wiring modernization totaling: 6,000—100-amp service entrances, 2,600—60-amp service entrances, and 40,000 wiring improvements, according to Vice Pres George Whitwell. At the same time 100-amp services in new homes increased from 20.4 to 30%.

P. M. Aldew, also PE, said that the public schools of Philadelphia have only recently invited the company to tell the wiring story to their students.

Direct mail and a business reply card were key factors in a wiring modernization program by United Illuminating Co, New Haven, that doubled the number of homes being rewired in the territory, L. A. Dunn reported. Advance work with dealers and electrical contractors was an important part of the activity which was based on hard selling. Major appliance sales increased 25%.

The National Electrical Contractors Association study of what makes people buy wiring showed that a positive approach, an objective attitude, was better than the negative or "scare" approach. Cost is not a major deterrent to wiring sales. Other factors are more important, Arthur E. Bertke reported. People prefer the term additional wiring to either of the terms adequately wired or rewired.

Dealers are not supporting the wiring program, and many do not even know it exists, Don Gabbert, president, National Appliance and Radio-TV Dealers Association, declared. Dealers don't care whether they sell electric or gas appliances, and most of them follow the rule of never discussing wiring when making an appliance sale unless the customer brings up the subject. This condition will continue to prevail until dealers lose enough business to make them do something about wiring, Gabbert said.

Plans for a stupendous nationwide campaign for more Housepower through improved wiring were de-

(*Continued on page 55*)

VP C. W. SCHWEERS, left, Allis-Chalmers Mfg. Co; John Biggi, NAWB; and VP Carl T. Bremicker, Northern States Power, general chairman of the conference

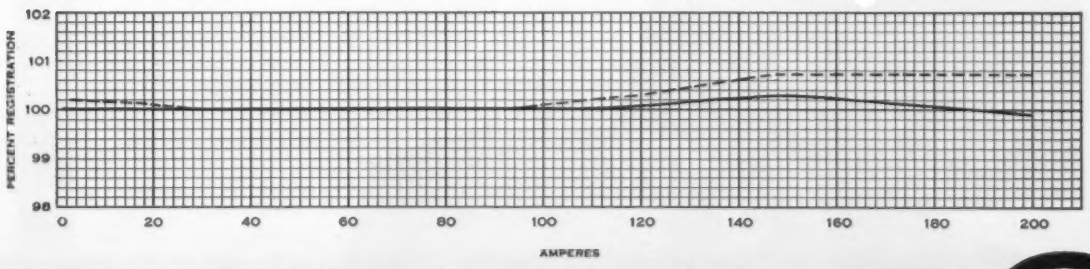
...match your 200 ampere service entrance equipment with Sangamo J2 200 ampere meters

With bigger and bigger loads to handle every day, it makes good sense to match full service entrance capacity with watthour meter capacity.

Sangamo J2 50-ampere nameplate rated watthour meters have straight-line accuracy up to 200 amperes.

Torque characteristics of the 50-ampere J2 are high . . . 74.0 mmg. at nameplate rating. Average starting watts are low—only 18 watts. Just twice the starting watts of the J2 15-ampere meter.

The straight line accuracy of the J2 50-ampere single-phase will meter your "full use" customers' loads even if their demand goes to 48 KW. Take a look at the chart at the bottom of this page.



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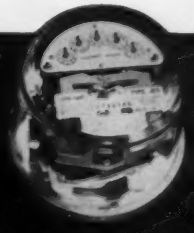


SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

Save As Much As Half . . .
Get Finest Protection . . .
with THOREX ARRESTERS

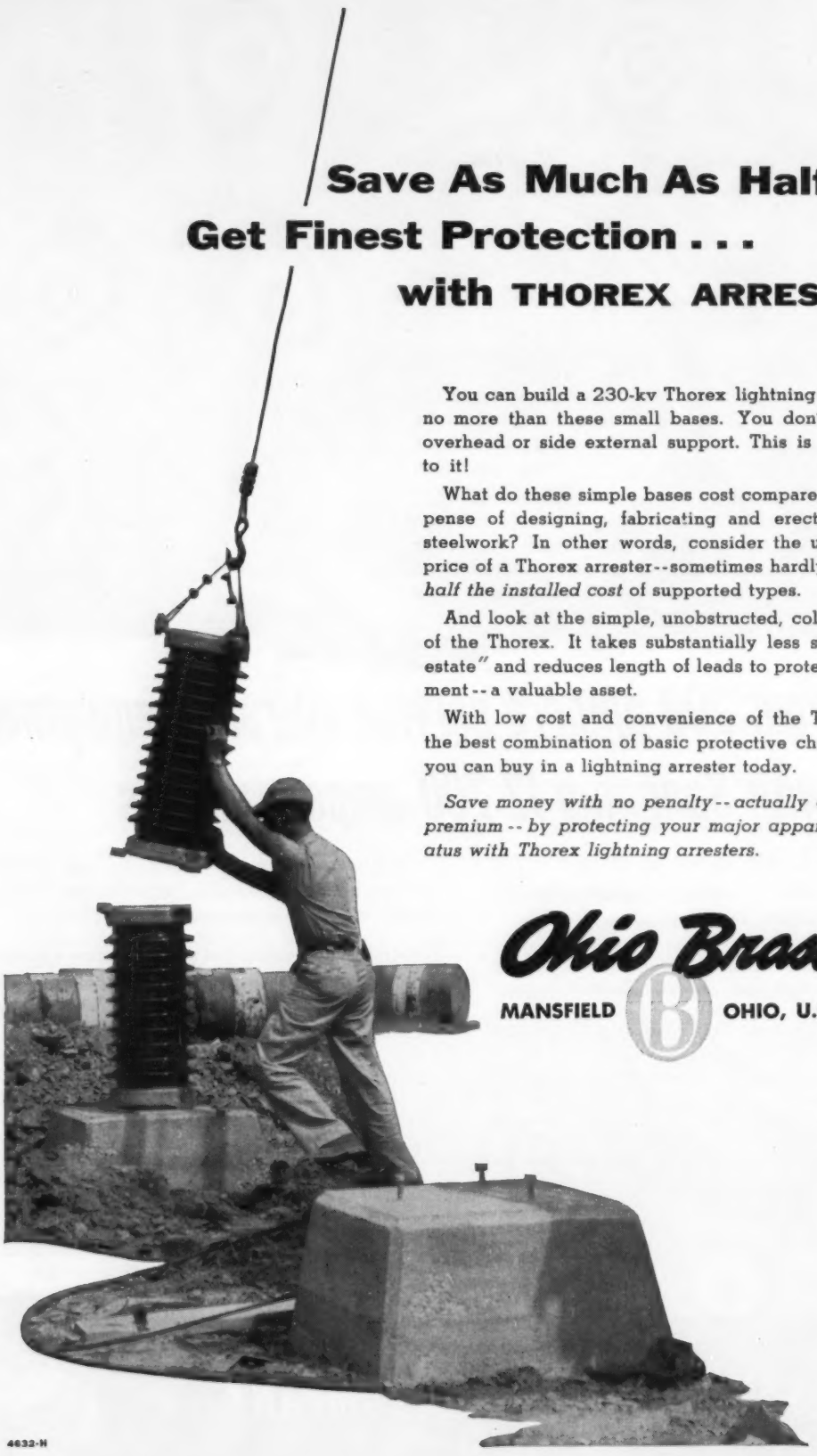
You can build a 230-kv Thorex lightning arrester on no more than these small bases. You don't need any overhead or side external support. This is all there is to it!

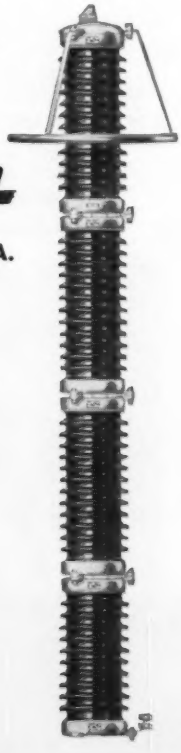
What do these simple bases cost compared to the expense of designing, fabricating and erecting special steelwork? In other words, consider the ultimate low price of a Thorex arrester--sometimes hardly more than *half the installed cost* of supported types.

And look at the simple, unobstructed, columnar form of the Thorex. It takes substantially less station "real estate" and reduces length of leads to protected equipment--a valuable asset.

With low cost and convenience of the Thorex goes the best combination of basic protective characteristics you can buy in a lightning arrester today.

Save money with no penalty--actually a premium--by protecting your major apparatus with Thorex lightning arresters.





Ohio Brass

MANSFIELD OHIO, U.S.A.

4632-H

1956 Foreseen

(*Continued from page 52*)

scribed by E. O. George, chairman of EEI's Adequate Wiring Promotion Committee. The goal that has been set calls for the rewiring of 2 million homes a year for 10 years, a total of 20 million homes. A $100,000 consumer participation contest will be a part of this program, George said. In a panel discussion on Tomorrow's Wiring Standards, H. U. Wright, Washington Water Power Co, said Spokane adopted the 200-amp service because with customer usage averaging 7,000 kwhr per year, loads were already at 96 amp. Since its adoption towns around Spokane have followed suit, and other cities are expected to.

Adoption of the proposed 100-amp meter center by Chattanooga was a mere paper transaction because there is a 32% saturation of all-electric homes, including electric heating, in the area. Therefore a 100-amp service is becoming a common installation, Robert E. Reeves, Chattanooga Electric Power Board, said.

John H. K. Shannahan, Indiana & Michigan Electric Co, declared that electric heating prepares the customer for wiring needs and paves the way to getting other appliance business. Average energy use in the area is 4,000 kwhr per customer per year. They are now planning discussions that are expected to lead to the adoption of code requirements calling for 100-amp service entrances.

L. R. Mast, Electromode Division of Commercial Controls Corp, told the conference that there are nearly half a million homes electrically heated. For such service, he said, a minimum 100-amp service is needed, with provisions for expansion.

Work done with electrical contractors by the Noland Co, distributors of Newport News, Va., to boost the rewiring activity has resulted in 350 rewiring jobs totaling $80,000. Work reached the point that lack of journeymen electricians was the bottleneck in the activity, C. P. Andrew reported.

C. W. Schweers, Allis-Chalmers Mfg Co, described his company's interest in adequate wiring. He said a "hats off" job has been done on adequate wiring in the past. Today, coats are off for the job that must be done for the future.

This year, 1956 will be a year of coordination by the National Adequate Wiring Bureau, L. E. Barrett, Barrett Electrical Supply Co, St. Louis, said in describing the Bureau's plans. NAWB activity will be built around the two industry activities, the Live Better—Electrically program and the Housepower program. An effort will be made, said Barrett, to get local organizations to take maximum advantage of national advertising and make it their own.

Since starting its program in 1947, 2,261 wiring jobs have been certified, said E. B. Brandt, Florida Power.

Philadelphia Electric won first award in the utility field in Look Magazine's wiring competition. Honorable mention went to: Consolidated Edison Co of New York, Delaware Power & Light Co, Houston Lighting & Power Co, United Illuminating Co, and Wisconsin Electric Power Co.

More Industrial Heating Load Sought

(*Continued from page 46*)

sidering every single phase of all of the operations involved."

Meyer cited a recent study of heating methods in the final exhaust of television tubes. A strict fuel comparison showed that the actual cost would be 2¢ per tube more with electric than with gas heat. The tube, at the final exhaust stage, represents a value of $20 to $25, he noted.

• Numerous case studies showed how a utility sold electric heating to an industrial firm which previously used another fuel. Inevitably, electricity cut the customer's over-all costs beyond expectations and simultaneously added a significant load on the utility's system.

The conferees were urged to emphasize to their prospects that electric furnaces maintain their efficiencies as high throughout life as when new.

Carl J. Sodergren, Baltimore Gas & Electric Co's industrial power department, cited electric furnaces at a galvanizing plant that were producing at lowest cost after 20 years of operation. Oil furnaces at another galvanizing plant, he said, were completely worn out after a similar life, even after being rebuilt several times.

BG&E sold two 280-kw electric furnaces as replacements for oil-fired units to a firm engaged in hot-dip galvanizing, Sodergren recalled. He declared that the furnaces paid for themselves in the first year of operation. Savings in zinc were realized to the tune of about 10%, he said. Labor savings were about 20%, and working conditions were greatly improved.

• The role that electric heat can play in the research and development of new metals was pointed out by several speakers.

Vacuum annealing techniques are the present key to the practical application and usage of titanium, a high-strength high-temperature metal spawned to meet the stringent requirements for military aircraft. This was emphasized by R. R. LaPelle, manager, furnace and close atmospheric generator section, Industrial Heating Division, Westinghouse Electric Corp.

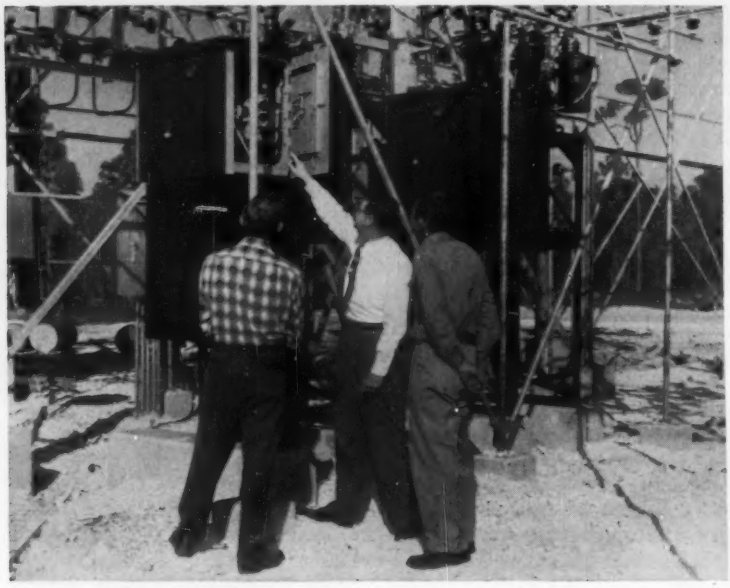
"Vacuum annealing furnaces are by necessity electrically heated in most applications although gas-firing can be used for smaller units."

LaPelle predicted that the experience now being accumulated in this field will lead to "great developments in the near future that will lower the operating cost of such equipment." Thus electric heat could help lead to a more widespread civilian and military use of titanium.

• Salesmen can provide their customers with "more than the normal curb service" by helping them make a thorough cost analysis before deciding on their heating equipment. This was urged by R. W. Kise, manager, marketing administration, General Electric.

A thorough cost analysis covers direct labor and supervisory costs, direct and process material costs, quality and uniformity of product, and material handling, Kise noted.

He pointed out that the salesman should determine whether heating equipment can reduce or eliminate subsequent operations such as grinding, machining, or cleaning.



FP&L Installs 5-Cycle 14.4-Kv Breakers

Two 5-cycle, 14.4-kv distribution breakers shown are an installation in the Homestead Air Base substation of Florida Power & Light Co. These General Electric Co units are reportedly the first of their type to be installed in the United States. These breakers were first announced last summer (EW, June 13, 1955, p 142).

Operation of the breakers is being explained by W. C. Mitchell, Jr., center, of G. E.'s High Voltage Switchgear Department, to two employees of the Florida utility.

Advantages of 5-cycle breaker, according to G. E., include opportunity to increase transformer sizes to meet load growth without changing to larger wire sizes, reduction in risk of line burn-down, and closer co-ordination of fuses.

American Standards Published or in Process

American Standards Association, New York, has advised the status of the following American Standards.

Published—Methods of Conditioning Plastics and Electrical Insulating Materials for Testing, ASTM-D-618-54, ASA-C59.28-1955; Price $0.30. Electrical Indicating Instruments, C39.1-1955; Price $2.

Approved—Single and Heavy Vinyl Acetal Coated Round Copper Magnet Wire, NEMA-MW15-1955, ASA-C9.5-1955. Heavy Vinyl Acetal Coated Rectangular and Square Copper Magnet Wire, NEMA-MW18-1955, ASA-C9.6-1955. Double-Paper Single Cotton-Covered Rectangular and Square Copper Magnet Wire, NEMA-MW32-1955, ASA-C9.7-1955.

In Standards Board—Insulators for Electric Power Lines, C29. Definitions of Terms for Audio Techniques, C16.24; for Television Signal Measurement, C16.27; for Electron Tubes, C60.9; for Magnetrons, C60.10; and for Semiconductors, C60.14.

St. Joseph to Build Station

St. Joseph Lead Co, New York, has awarded a contract to Kaiser Engineers, Oakland, Calif, for the design, procurement and contribution of a steam power plant at Josephtown, Pa., to cost approximately $16 million. To be located on the site of St. Joseph's zinc smelting plant on the Ohio River, the power plant will have two 50,000-kw turbogenerators, switchgear, transmission lines plus other supporting facilities and provisions for expansion. It is scheduled to begin operation in about 24 months.

Johns-Manville to Build Another Transite Plant

Johns-Manville Corp will shortly start construction of a new plant near Stockton, Calif., for the manufacture of Transite asbestos-cement pipe products, said A. R. Fisher, president.

The plant is expected to be completed by the middle of 1957. It will have an area of about 225,000 sq ft and employ initially about 350 people.

Transite pipe products to be manufactured at Stockton will include electrical conduits, underground water mains, sewer mains, industrial process lines, irrigation lines, flues and vents, and ducts and stacks.

Orangeburg to Expand into Plastic Pipe Field

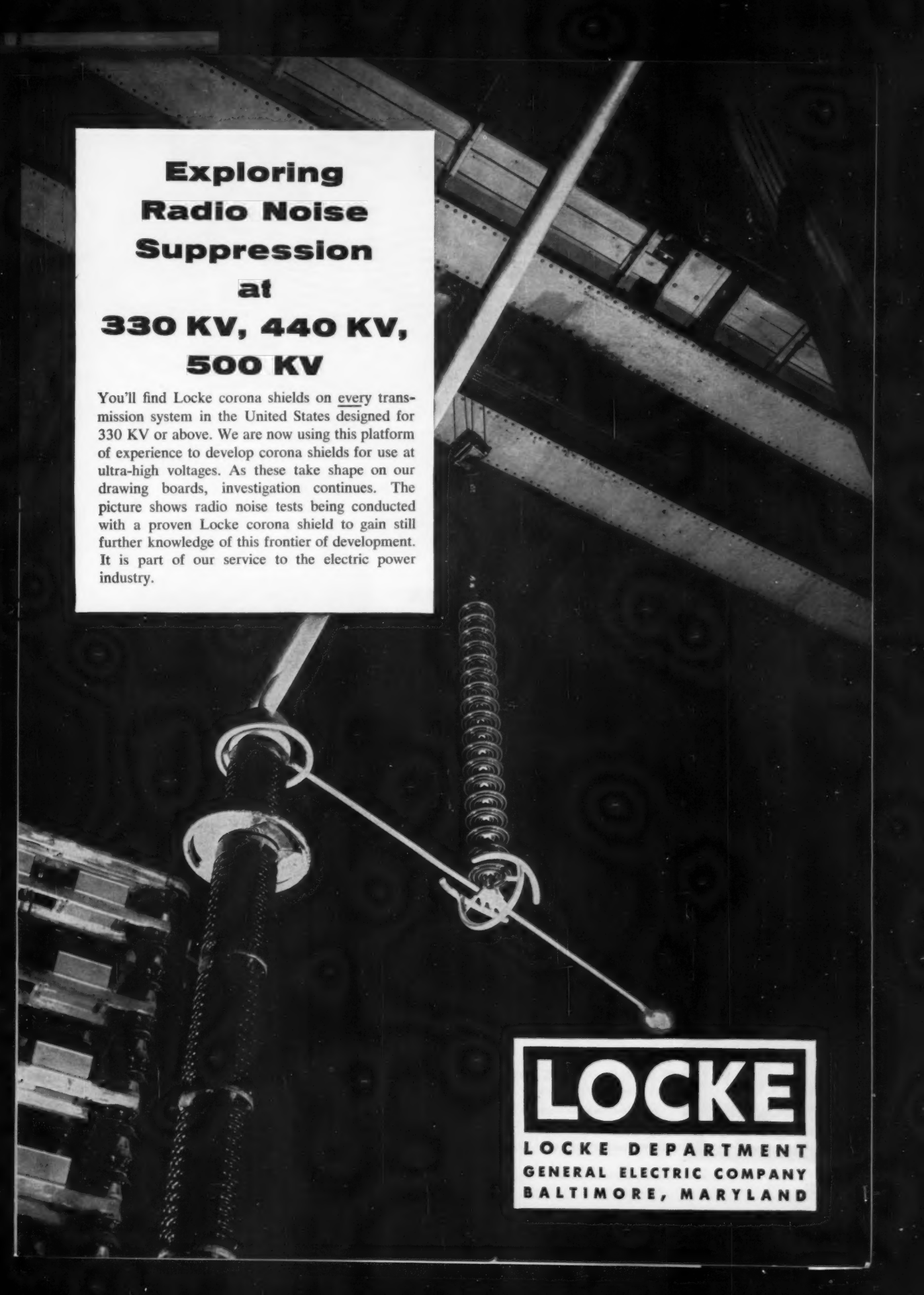
Orangeburg Manufacturing Co, will have another product—plastic pipe. This will be in addition to the company's line of electrical fiber conduit and bituminized-fiber sewer pipe, advised H. J. Robertson, president. The plastic pipe will be marketed through existing Orangeburg distributors.

Work has started on a plastic pipe plant adjoining the company's Orangeburg, N. Y., plant. The addition is scheduled for completion in July. The company has another plant at Newark, Calif.

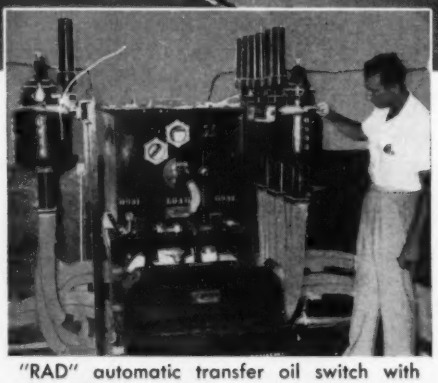
ABW New Leeds Plant

Anderson Brass Works Inc, Birmingham, Ala., has completed the building, as originally planned, for the Leeds, Ala., operation. However, increasing demand for aluminum products necessitated an addition to the main building, said R. E.

(*Continued on page* 59)


Exploring
Radio Noise
Suppression
at
330 KV, 440 KV,
500 KV
You'll find Locke corona shields on every transmission system in the United States designed for 330 KV or above. We are now using this platform of experience to develop corona shields for use at ultra-high voltages. As these take shape on our drawing boards, investigation continues. The picture shows radio noise tests being conducted with a proven Locke corona shield to gain still further knowledge of this frontier of development. It is part of our service to the electric power industry.
LOCKE
LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

Powering the glow of the Fontainebleau!



"RAD" automatic transfer oil switch with "FC" oil fuse cutouts.

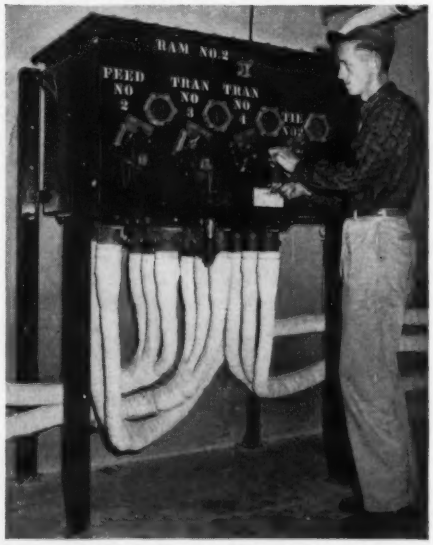
G & W AND FLORIDA POWER & LIGHT COMPANY WORK BEHIND THE SCENES HELPING FLORIDA GROW!

Florida Power & Light Company, serving one of the nation's fastest growing areas, uses the most modern equipment to provide dependable power for Florida's new homes, businesses and industries.

For the giant Fontainebleau Hotel, fabulous Miami Beach showplace, Florida Power & Light Company chose G & W "RAD" automatic oil switches and "FC" oil fuse cutouts to handle the 13.2 Kv. supply circuits into the hotel, and G & W "RAM" oil switches for power distribution throughout the building.

If you, like Florida Power & Light Company, wish to assure dependable operation of your distribution system, specify G & W!

G & W type "RA" oil switches, like these at the Fontainebleau, have had a remarkably trouble-free record . . . they combine simplicity with economy in construction, installation, and maintenance . . . provide for prompt restoration of service, isolation of cable sections, and rerouting of circuits in emergencies.



"RAM" load break 4-way oil switch.

D566

G & W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois, U. S. A.

Representatives in principal cities of U.S.A.

Canadian Mfr.
Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

(*Continued from page 56*)

Schuler, president. The structure will now be 220 ft long by 70 ft wide. Equipment placement is in process and operations are expected to begin late in April, Schuler reports.

M&M BRIEFS

Hotpoint Co, Chicago, will add to its list of home appliances a line of 14 to 24 in. screen black-and-white television receivers in July. Color receivers will be added later.

General Motors Corp declared recently that its employee suggestion plan set records in 1955. GM said that 228,437 suggestions were submitted and 54,635 were adopted. The company paid $3,225,741 in awards.

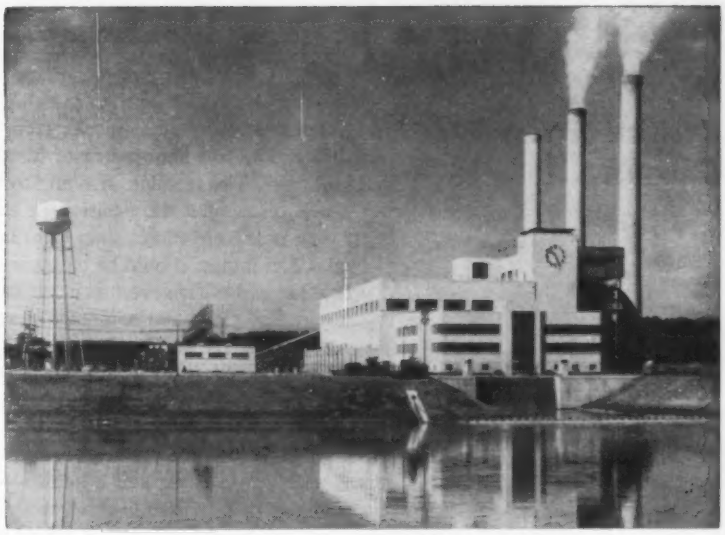
M. W. Kellogg Co will have new headquarters at 711 Third Ave (between 44th and 45th St), New York, N. Y. after April 29. Pullman Inc, Kellogg's parent company, and Trailmobile Inc, another subsidiary, will have offices in the new building.

Aluminum Co of America has begun production five weeks ahead of schedule at expanded potroom facilities at Point Comfort, Tex. The first of two new potlines at Rockdale, Tex., is slated for operation this month. When complete, the expansions will boost Rockdale capacity by 50,000 tons of primary aluminum annually and that of Point Comfort by 25,000 tons.

American Steel & Wire Division of United States Steel Corp will begin construction this month of a new welded wire fabric mill. This mill should add up to 40,000 tons of finishing capacity annually to the Cuyahoga Works at Cleveland, Ohio.

Radio Corp of America recently announced that its Bloomington, Ind., plant has been geared to mass production of color television receivers. RCA expects to make and sell more than 200,000 color sets this year.

Germanium Products Corp has begun large-scale production of silicon-grown junction transistors. The Jersey City firm is a subsidiary of Bogue Electric Mfg. Co, Paterson, N. J.



Cooling Cut Station Building Costs

Dayton (Ohio) Power & Light Co has found that air conditioning its new O. H. Hutchings Station above saved building costs and improved working conditions.

In addition to higher performance by plant personnel, DP&L saved construction costs by eliminating the need for numerous windows. Reduction in crack area and glass exposure helps cut expense of winter heating and summer cooling.

The 360,000-kw plant uses 60F well water for sensible cooling and a Kathabar humidity conditioner which automatically maintains constant relative humidity at 82F. The Kathabar unit, made by Surface Combustion Corp, Toledo, operates at 5,000 cfm.

MANUFACTURERS' EARNINGS

COMPANY	PERIOD MONTHS	ENDED	NET INCOME 1955	NET INCOME 1954	EARNINGS PER COMMON SHARE 1955	EARNINGS PER COMMON SHARE 1954
Allis-Chalmers Mfg.	12	Dec. 31	$24,805,326	$26,130,430(h)	$6.05(a)	$7.20(a)
American Tel. & Tel. & Subs	12	Dec. 31	664,243,416	549,931,223	13.10(c)	11.92(c)
Fairbanks, Morse & Co.	12	Dec. 31	2,707,143	2,478,198	2.21	2.03
Foster Wheeler Corp.	12	Dec. 31	1,289,602	3,587,837	2.19	6.16
General Electric Co.	12	Dec. 31(p)	200,923,835	198,913,221	2.32	2.30
Mallory, P. R., & Co.	12	Dec. 31	2,225,549	1,071,803	2.04	0.79
McGraw Electric Co.	12	Dec. 31(p)	9,501,000	9,417,000	4.51	4.59(j)
McGraw-Hill Publishing Co.	12	Dec. 31	6,283,951	5,924,300	7.14	6.73
Minneapolis-Honeywell Reg.	12	Dec. 31(p)	19,275,000	15,345,203	2.98	2.42
Ohio Brass Co.	12	Dec. 31(p)	1,825,234	.....	5.25	....
Olin Mathieson Chemical	12	Dec. 31(p)	44,558,000	38,075,000	3.51(c)	3.11(c)
Orangeburg Mfg Co.	12	Dec. 31	865,347	664,986	2.36	1.82(b)
Owens-Illinois Glass	12	Dec. 31	27,022,310	21,538,965	4.42	3.52(b)
Philco Corp.	12	Dec. 31(p)	8,423,329	6,768,965	2.13(a)	1.69(a)
Radio Corp of America	12	Dec. 31	47,525,465	40,525,459	3.16	2.66
Reynolds Metals	12	Dec. 31	34,306,521	20,280,908	3.41	2.02(b)
Sperry Rand Corp.	6	Dec. 31	23,585,563	.....	0.92	....
Sylvania Electric Products	12	Dec. 31	13,812,970	9,480,941	4.29(a)	2.92(a)
U. S. Rubber Co.	12	Dec. 31(p)	33,559,000	27,959,000	5.24	4.29
Wagner Electric Corp.	12	Dec. 31	4,755,079	1,936,723	5.04	2.05
White Motor Co.	12	Dec. 31	6,061,180	4,888,644	5.90(a)	5.37(a)

(a) Based on number of shares outstanding at close of the period. (b) Based on shares now outstanding. (c) Based on average number of shares outstanding during the period. (h) Gives effect to $1,118,540 refund to prior year's taxes. (j) Adjusted to reflect 2-for-1 stock split in 1955. (k) Includes $1,655,423 profit on disposal of capital assets and $400,000 tax credit. (p) Preliminary statement.

BUSINESS OUTLOOK

Electrical World
MARCH 12, 1956

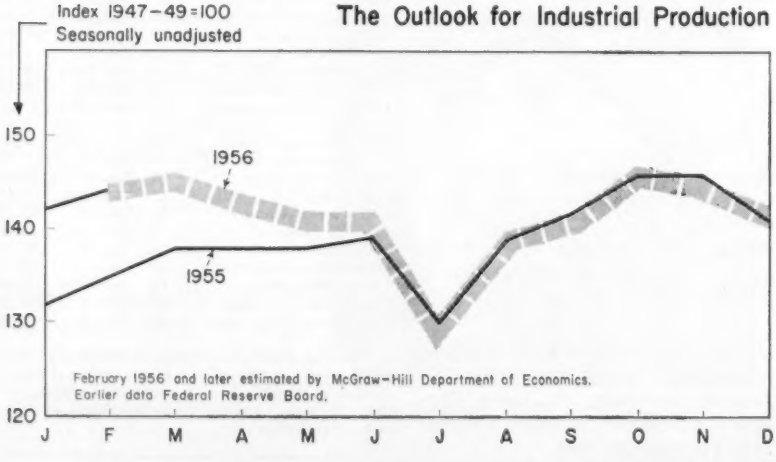
Don't expect any dramatic results from the President's announcement of his availability. The full importance of his decision would have registered only if he'd said "no". The reaction in Wall Street showed the business community had pretty well discounted the decision in advance. **The actual effect is sustaining rather than positively stimulating.** Consumer willingness to buy won't be greatly affected. Chief impact should be on business willingness to invest: continuance of favorable tax and other government policies now seems more likely. But business expenditures on plant and equipment have, for months, been the brightest spot in the picture anyhow. The President's statement should be helpful chiefly in strengthening business determination to carry through **present** expansion plans, despite the temporary lull in growth of consumer sales.

Car sales, incidentally, may already have turned the corner. It looks now as if February sales were over half a million—a record for the month. With production running 18% under last February, this has helped pare down the still uncomfortable excess in dealer's stocks. Production in January and February has been just an eighth below last year. **A 15% pickup in March is anticipated just on a seasonal basis.** A 6½ million car year, or better, still seems like a safe enough bet for 1956, on the basis of what's happened so far.

An end to the decline in housing starts can also be seen ahead. More mortgage money from "Fannie May" (the Federal Mortgage Association) is definitely on the way. With financing assured, many of the large builders are now planning to step up their rates to the 1955 level. Even if the annual rate of new starts goes as low as 1 million for March and April, there's reason to hope the industry could get it back as high as 1.3 million before the end of the year. When you add in the booming activity in commercial and industrial construction, you have a pretty solid outlook for capacity operation in the construction industry—irrespective of how fast the new road, school, and other public work programs get under way.

Consumption should rise too, despite higher savings. The new minimum wage adds over half a billion dollars to consumer income immediately. With other expected wage boosts, and still likely tax cut, **spendable income of consumers could easily be up $8 billion by Christmas.**

The Outlook for Industrial Production



THIS IS A ONE-PIECE PORCELAIN

This is the interrupter unit for a porcelain-clad 230 Kv oil-blast breaker. It is, we believe, one of the largest pieces of top-quality electrical porcelain ever produced. Strictly a homogenous one-piece porcelain, it has no glazed joints or other interruption of the continuous porcelain body. It is 112″ long, has 246″ leakage distance and weighs 1325 pounds. It will be supplied with large heat-treated cast aluminum flanges, and with ends ground for gasketing.

Visitors to the Lapp plant find the production rows of these units an impressive sight. We're proud of them, too—mostly because they dramatize and emphasize our often-repeated claim. Lapp experience . . . Lapp techniques of production and control . . . Lapp enthusiasm for the manufacture of sound porcelain . . . add operating security and long life to the systems on which Lapp insulators are installed.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

IN THE INDUSTRY

Will Utilities Get the Talent They Need?

Not unless they step up recruiting programs, make utility work more attractive to engineering students, say utility men and professors at AIEE symposium

Electric utilities now need 15 to 20% of the electrical engineering graduates to keep staffs at full strength and make up for lag in recruiting. This is the finding of Frank E. Sanford, Commonwealth Associates, Inc, who indicates this need is not currently being met. "Far less than this number are interested in power now," said Sanford, "and the increase in the prospective supply will not in itself meet the needs unless the percentage (of graduates going to utilities) can be increased also."

Utility Work Is a Challenge

Sanford's remarks, delivered at the education and research symposium of the American Institute of Electrical Engineers at its Winter General Meeting, triggered warm comments on the pros and cons of utility needs and recruiting. Murray Joslin, vice president, Commonwealth Edison Co, asserted the electric utility business offers promising and satisfying opportunities and is a good place in which to seek a career. He said his company does not hire as many young engineers as studies show it should because efforts are being made to use engineering manpower more effectively.

Challenge offered in the utility field covers many areas that should attract the engineering graduate, said C. R. Joy and C. C. Boone, Ebasco Services, Inc. They presented a paper entitled "Megawatts vs. Microwatts" in which they told of interesting problems facing the utility engineer.

Different views came from two members of university engineering faculties. Dean J. D. Ryder, Michigan State University, told the symposium, "Until such (research) programs of fundamental work, divorced from day-to-day operations and planning, are undertaken in the utilities, it seems unreasonable to expect a reversal in the trend of the young engineer away from the utilities, a shift which has already taken place with respect to another utility, the railroads."

Prof J. S. Johnson, head of the School of Electrical Engineering, Purdue University, said, "The electric utilities are lagging far behind in attracting the services of enough good engineers. They are getting some recent college graduates, and a few of them are good men. By and large, however, they have not gotten the best men by any means."

Must Glamorize the Industry

Johnson went on to say that electric utilities are not presenting the industry colorfully, but in black and white. To get the kind of men needed, Johnson suggested glamorizing the power industry, upgrading wages for utility engineers, more challenging problems for the young engineer, hiring electrical engineering professors as utility consultants so they can become more familiar with utility problems, inaugurating research projects, and providing training periods for young engineers just entering the utility field.

TECHNICAL NOTES

Plastics used to insulate wire increasingly resemble those used to package over-the-counter items. Perhaps wire joints will be sealed by heat-pressure welding already used to seal the packages.

Hermetically sealed transformers with inhibited oil eliminate leakage and sludging except possibly during prolonged severe overloads. Are oil-level indicators, drain valves, and filter press connections still necessary?

High temperature of the coolant pumped by canned-rotor motors in nuclear power plants requires Class H motor insulation. This limitation restricts the choice of pump supply voltage.

Capacitor fusing objective is to isolate a failed unit before energy discharged into it by other units in parallel ruptures its case.

New standard item for utility procurement is dog candy to improve canine relations of meter readers. Justification is measured in fewer dog bites per man. Statistics might show better acceptance than squirt pistol techniques.

TVI may come from pole-line hardware arcing at poor bolt contacts. Configuration of the hardware sometimes provides an effective radiator at TV frequencies without causing audible interference with radio broadcasts.

House Passes Upper Colorado Bill

(*Continued from page* 9)

and repeated his plea for action this year.

On the day before the House voted last week, the President once again made an urgent request for a favorable vote. Conservationists had already been mollified by withdrawal of Echo Park. Eastern opponents of Western reclamation in general, and southern Californians continued to fight. But the crucial vote—the farm bloc which had been wavering because of charges Colorado water would be used to bring arid acreage into production with surplus crops already contributing to depressed farm prices—had not made up its mind.

Say Eisenhower Plea Gains Votes

The President's plea, coming as it did in conjunction with his announcement to run again for the White House, was credited by the bill's supporters with turning at least 50 fence-sitting votes their way. With Eisenhower's request, opposition spokesmen admitted even before the House vote they had lost the fight.

They went down hard, though. During its year-long battle to kill the plan and maintain uninterrupted flow of the river's waters into southern California, the opposition coalition tried out every maneuver in the book:

• Rep Craig Hosmer (R-Cal.), spokesman for downstream interests, visited the Glen Canyon Reservoir site, returning with a bucketful of two-inch chips of chinle shale, a soft soapstone-like rock which lines the canyon walls. Hosmer mailed these to members of Congress. His claim: The rock dissolves in water. His implication: The entire reservoir—the key link in the water chain draining the great four-state upper basin area—would crumble, proving disastrous to a carefully-planned, $400-million taxpayers' investment.

Supporters Deny Hosmer's Claim

The bill's proponents struck back. They claimed that Hosmer had been forced to travel 50 miles back into Glen Canyon to find his crumbled rock samples. They also pointed to a Corps of Engineers permeability test, which had shown the canyon's walls would absorb water only to a depth of 6 inches.

• Hosmer pumped home the theme that cheap atomic power is close at hand, and so the entire development scheme would prove a foolish expenditure of money within a few years.

• Rep John Saylor (R-Pa.), the most persistent opponent of western reclamation and an influential member of the House Interior Committee, worked with Hosmer. His cry: The entire project would prove unfeasible because of the elimination of Echo Park Dam, termed earlier a vital feature of the plan. Last year Saylor had led the fight against Echo Park.

The House Interior Committee had voted out its bill last session. In completing its work last summer, it had worked out the deal for dividing up the power revenues to finance future irrigation projects, and set in motion the machinery to so amend the bill on the House floor. This method permitted final action without a retrial of the whole issue through Congress.

But it also left the bill open to other amendments. Rep James Roosevelt (D-Cal.), a lower basin representative, tried to push through an amendment to prohibit use of any water impounded by the storage dams for power production.

Saylor tried to substitute a measure to appropriate $421 million—equal to Glen Canyon's cost—for the upper basin states to build their own dams. Both were rejected by unrecorded vote.

Avery Change Favors Farmers

A successful amendment, to assure the farm bloc, was offered by Rep William H. Avery (R-Kan.). Avery's change requires that no water for newly irrigated land may be used in the next ten years to produce farm crops already in surplus. The project would reclaim 132,000 acres of semi-arid land and provide more water for 234,000 acres now under irrigation.

Upper Colorado basin adherents expect action on the bill to be completed during this session, and, although they would like to see the entire string of dams approved as a package, they are confident that the others will come, in time.

U.S. Must Back Private A-Industry

(*Continued from page* 10)

extraordinary risks is paramount.

"Government officials say they are convinced no private reactor will ever 'blow up'," he explains. "We in the atomic industry share this view; we are fully confident that there will never be a 'Texas City' type disaster in this field. We are proving this by offering to invest millions of our shareowners' dollars in our development plans. Why, then, should not the federal government be willing to provide the assurance needed by the public that these plans are safe? Why should we, who, if these plants are really dangerous, risk our lives every day, be forced to advance the solvency of our entire enterprises as proof of our faith in what we are doing?

"In our view, the government should share this faith, not only in words, but in deeds. It can do this by providing the public with the assurance that extraordinary risks which cannot be underwritten by private insurance firms will be underwritten by the government."

McCune's recommendation represents a relatively inexpensive way out of the government's current dilemma. Probability of a catastrophe at a private nuclear installation is extremely remote. Therefore, little, if any, risk to federal funds offered for an insurance program exists. Furthermore, according to McCune, industry would be willing to pay for such indemnity; so there is even a possibility of a profitable federal operation.

Murray's alternative—a federal reactor construction program—was not prompted simply by the warnings of the private companies that they are reluctant to risk stockholders' capital unless adequate insurance were offered. It was based also on his desire to obtain a federal "yardstick" of nuclear power operating and construction costs, a possible speed-up in the world-wide race to obtain economic

power from the atom, and the traditional democratic reluctance to place primary responsibility on private industry for development of what he considers a natural resource.

Murray's reasoning was supported last week by the AFL-CIO Electrical, Radio & Machine Workers Union and Leland Olds, former Democratic member of the Federal Power Commission and long-time advocate of federal power production. Olds and Benjamin C. Sigal, representing IUE, called for adoption of Murray's federal nuclear power plan and declared that the U. S. is losing out to other nations in the race for atomic development.

Congress Must Act Soon

Congress, guided by the findings of the Joint Atomic Energy Committee, must decide which course to take. But both sides make this clear: A decision must be made soon, undoubtedly during this session. If it is not, the implication of the experts is clear, the U. S. will have lost its leadership in this new and important field.

Lindseth, speaking for EEI, told the committee, "We do not feel that there is any present need for the government to embark on a large scale program of building 'demonstration' reactors with taxpayers' funds, particularly in the present state of knowledge of the art."

Present plans for developing various types of reactors should be pursued in an orderly way and additional stops should be taken only as fast as the development of the art justified, said Lindseth.

He pointed out that 44 companies are now participating in the building of seven large and medium reactor plants and two small ones.

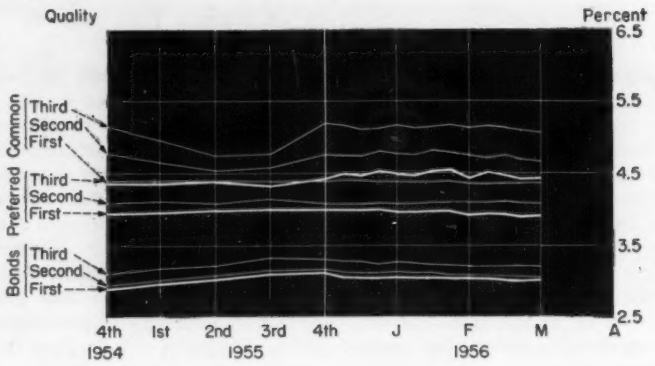
Total generating capacity for the nine plants is 1,112,500 kw, and 300-million "free enterprise dollars" are already involved, he said.

EEI Against Preference

The Institute, Lindseth told the committee, strongly advocates revisions in the Atomic Energy Act which would eliminate discriminatory features that are unfair to taxpayers generally, and to the more than 41 million customers of the investor-owned electric companies in particular.

Lindseth advocated elimination of two preference clauses—one dealing with disposal of by-product energy and the other with license applications.

Today's Utility Yields (%)



QUALITY	BONDS			PREFERRED STOCKS			COMMON STOCKS		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Mar. 1	3.02	3.06	3.20	3.93	4.09	4.38	4.45	4.69	5.08
Feb. 23	3.02	3.06	3.20	3.92	4.09	4.38	4.45	4.70	5.12

Utility Earnings

COMPANY	PERIOD MONTHS ENDED		NET INCOME 1955	NET INCOME 1954	EARNINGS PER COMMON SHARE 1955	EARNINGS PER COMMON SHARE 1954
Baltimore Gas & Electric	12	Dec.	$14,074,652	$12,140,596	$2.11(a)	$1.95(a)
Boston Edison	12	Dec.	9,232,282	8,459,544	3.40	3.12
Niagara Mohawk Power	12	Dec.	29,374,000	27,760,000	2.22	2.11
Philadelphia Electric	12	Dec.	33,219,035	30,889,079	2.43(a)	2.34(a)
Public Service Electric & Gas	12	Dec.	30,333,686	27,541,724	2.26(a)	2.00(a)
Public Service of Indiana	12	Dec.	12,536,223	12,175,837	2.35	2.38
Western Massachusetts Companies	12	Dec.	3,420,476	3,278,572	3.09	2.96

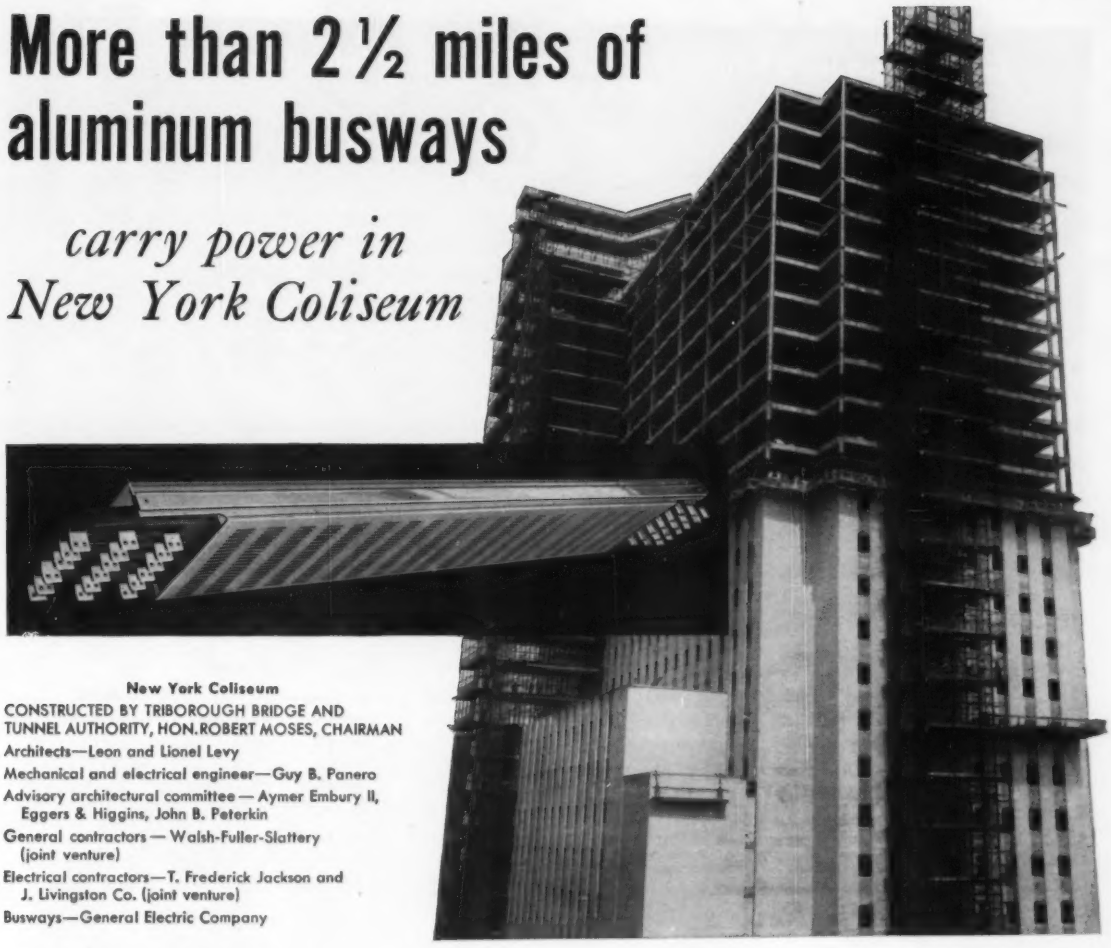
Note—All the figures shown above have been audited; (a) Based on average shares outstanding.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
MARCH 1-7			
BONDS			
Mississippi Power—1st mtg 3⅛% due 1986	$4,000	102.25%	3.26%
Houston Lighting & Power—1st mtg 3¼% due 1986	30,000	101.153	3.19
PREFERRED STOCK			
Mississippi Power—40,000 sh 4.40% $100 par	$4,093	$102.32	4.30%
COMMON STOCK			
Northern States Power—670,920 sh (being offered commonholders on 1-for-20 basis, record Mar. 1 to expire Mar. 20)	$11,238	$16.75	5.37%
SCHEDULE FOR MARCH			
BONDS			BID DATE
Alabama Power—1st mtg due 1986	$14,000	.....	Mar. 15
Narragansett Electric—1st mtg due 1986	10,000	.....	Mar. 20
Pacific Gas & Electric—1st mtg due 1986	25,000	.....	Mar. 20
Georgia Power—1st mtg due 1986	12,000	.....	Mar. 29
PREFERRED STOCK			
Louisiana Power & Light—70,000 sh $100 par	$7,000	.....	Mar. 20
COMMON STOCK			
Oklahoma Gas & Electric—298,479 sh (to be offered commonholders on 1-for-10 basis, record Mar. 8 to expire Mar. 27)	.....	.....	.....

More than 2½ miles of aluminum busways

carry power in New York Coliseum



New York Coliseum
CONSTRUCTED BY TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY, HON. ROBERT MOSES, CHAIRMAN
Architects—Leon and Lionel Levy
Mechanical and electrical engineer—Guy B. Panero
Advisory architectural committee — Aymer Embury II, Eggers & Higgins, John B. Peterkin
General contractors — Walsh-Fuller-Slattery (joint venture)
Electrical contractors—T. Frederick Jackson and J. Livingston Co. (joint venture)
Busways—General Electric Company

Important Innovations in Coliseum

New York City's new Coliseum is modern in every detail, particularly in its electrical distribution system. This 26-story office building, combined with 365,000 square feet of display space, has one of the first major installations of a higher voltage distribution system (480Y/277 volts). More than 2½ miles of busway incorporating aluminum conductors were used to feed power to this huge structure.

Higher Voltage System Saves Money

The higher voltage system provides greater capacity and flexibility than conventional systems. Yet it requires only half as many, or half as large, risers and feeders. Characteristics such as excessive voltage drop or costly power losses present no problems to this system. The use of lightweight aluminum bus bars makes the equipment easier to handle and easier to install.

More and more manufacturers of packaged electrical distribution systems are finding that Alcoa® Aluminum Bus Conductor offers advantages of lower cost, availability, design flexibility. Aluminum distribution bus weighs a third less than a copper system of equal conductivity. Pound for pound, it has greater current-carrying capacity than cable in conduit.

Alcoa Aluminum Is Your Best Bet, Too

Wherever your production requirements demand an efficient, flexible electrical distribution system, it will pay you to specify busways with Alcoa Aluminum Conductors. Write us for the names of manufacturers who specialize in this lighter, better, more economical product. Aluminum Company of America, 2306-Q Alcoa Building, Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

STATISTICS

Generation in '55 Jumped 15.8% Over '54; Sales Climbed 17%

(In Millions of Kwhr)

In 1955 utilities . . .		Of the total, utilities sold . . .	
Generated . .	546,404 (15.8% over '54)		120,524 to residential customers (11.1% more)
	433,683 by fuel (up 18.9%)		10,751 to rural customers (5.6% more)
	112,721 by hydro (up 5.3%)		80,759 to commercial customers (10.1% more)
			249,206 to industrial customers (24.5% more)
Imported . . .	3,310		
			4,373 to street & highway lighting customers (8.2% more)
Less . . .	11,734 used by producer		10,151 to other public authorities (7.7% more)
	1,541 in company use		2,540 to street and interurban railways (4.4% less)
	55,518 lost and unaccounted for		2,023 to electrified railroads (1.1% less)
			594 for interdepartmental users (4.3% more)
Leaving . . .	480,921 in sales to ultimate consumers (17% higher)		

Source: Edison Electric Institute

Power Statistics . . .

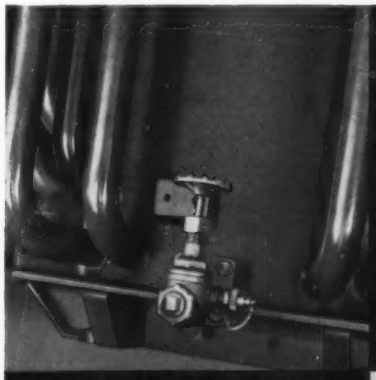
		Latest Month	Preceding Month	Year Ago	Annual Change%
Capacity	Dec.	114.37	113.55	102.59	11.5
Peak—Class I Systems (million kw)	Dec.	98.2	96.4	85.7	14.6
Estimated Dec. '54 Peak (million kw)	Dec.	105.27	104.55	102.64	2.6
Production—billion kwhr	Dec.	50.72	47.76	43.45	16.7
Hydro		9.31	9.21	9.05	2.9
Fuel		41.41	38.54	34.38	20.4
Sales—billion kwhr	Nov.	43.07	43.16	36.29	18.3
Residential		10.71	10.33	9.72	10.2
Commercial		6.61	6.87	6.08	8.7
Industrial		23.37	23.45	18.26	28.0
Other		2.38	2.51	2.23	6.7
Fuel Consumption	Dec.				
Coal—million tons		14.77	13.29	11.91	24.0
Oil—million barrels		8.54	7.10	7.69	11.1
Gas—billion cu ft		70.00	82.26	74.85	−6.5
Net Income Class A & B Co's—$ million	Nov.	104.29	95.67	95.12	9.6
Residential Customers—millions	12 mos.	44.41	44.30	43.14	2.9
Revenue per kwhr	ended	2.64¢	2.65¢	2.69¢	−1.9
Avg kwhr per customer	Dec. 31	2,751	2,728	2,549	7.9
Avg annual bill		$72.63	$72.29	$68.57	5.9

Business Statistics . . .

Indexes: 1947-49 = 100					
FRB Industrial Production	Jan.	143	141	132	8.3
ENR Construction Cost	Feb.	142.6	141.8	135.3	5.4
BLS Cost-of-living	Jan.	114.6	114.7	114.3	0.3
NEMA Sales	Dec.				
Insulation materials		160	155	138	15.9
Electric appliances		101	88	74	36.5
Wholesale prices	Dec.				
Motors and generators		127.2	127.0	121.8	4.4
Transformers and regulators		129.2	129.2	128.1	0.9
Switchgear and fuses		145.9	145.9	135.3	7.8
GNP—annual rate—$ billion	4th Qtr.	397.3	392.0	367.1	8.2

MOLONEY SAYS... DRAIN 'EM... SLIDE 'EM

Drain valves to drain out *all* transformer oil, and sled-type bases to ease installation and moving problems are but two of many plus features on Moloney Substation-type Distribution Transformers. Products of Moloney research, Moloney plus features are designed to benefit your utility in every way, adding up to better overall performance and long lived dependability.



All the oil drains freely with Moloney's new oil valve because the valve's seat is ⅛" below the transformer tank's bottom. The nylon-brass valve seat makes a positive seal, preventing oil leaks. But that's not all. The new drain valve actually requires less floor space since Moloney's compact new valve doesn't project out as far. Leaky pipe threads are eliminated, too, because the new drain valve *bolts* to a heavy flange that's sealed by a corprene gasket confined in a gasket retaining groove.

Sampling valve, mounted high on the valve body, has free access with plenty of space for the sampling cup, and operates only when drain valve is open.

It's easy to slide a Moloney Substation-type Distribution Transformer on its new sled base because its steel runners slide freely in any direction . . . and over any surface. Developed by Moloney engineers, the new sled base weighs less than former bases . . . yet it's actually stronger because it's made from steel channels. Continuous welds prevent corrosion at joints. Holes in base members provide ventilation, preventing condensation and corrosion.

Gussets strengthen base plate corners for jacking. Holes in each gusset make it easy to pull or guide transformers from any side. Corners of the new sled base are open, too, allowing plenty of space for jack clearance.

MOLONEY ELECTRIC COMP

Power Transformers • Distribution Transformers • Load Tap Changing Transformers
Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substati
Transformers • Network Transformers • Series Street Lighting Transformers • Subway Transformers
Industrial Dry Type Transformers • Capacitors • Magnetic Components for Electronics

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You get **MORE** when it's Built by Allis-Chalmers

Overload Protection
—without false alarms

Thermalite Indicators are unaffected by momentary overloads

When you see the bright indicator lights you know that overloads are nearing the limits of transformer capability . . . you know it's not a momentary overload. Regardless of ambient temperature, *Thermalite* device indicates excessive transformer operating temperature.

How it Works

A thermal element located in the top oil, safely away from all live parts, actuates a signal lamp circuit. The brilliant signal lamp remains lit until reset by the convenient external handle. *Thermalite* indicators do not interrupt service.

No time-consuming load surveys are needed because the clear signal of a *Thermalite* indicator can be seen from the cab of a service truck.

Stretch Transformer Dollars

You can utilize the inherent overload capabilities of your system when low-cost *Thermalite* indicators are used on your transformers.

Get them on Allis-Chalmers transformers 167 kva and smaller, 15 kv and below.

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